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1991-92 School Year

Annual Report

Diploma Examinations Program

Part 2: Examiners' Reports

English 30
English 33
Social Studies 30
Mathematics 30
Biology 30
Chemistry 30
Physics 30

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1991-92 School Year

Annual Report

Diploma Examinations Program

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Introduction

The *Annual Report, Diploma Examinations Program,* for the 1991-92 school year was published and distributed in April 1993. It contains summaries of provincial results for the eight diploma examination courses as well as results by gender, results for population subgroups, achievement-over-time studies, and a special study on participation rates in diploma examination courses.

This volume is a supplement to the main report. The first section contains reprints of the Examiners' Reports that were issued shortly after the January 1992 examination; the second contains the June 1992 reports. No *Examiners' Report* was prepared for Français 30 because of the small number of students involved.

If you wish to receive additional copies of this supplement, please contact Yvonne Johnson. If you have questions about these reports, please contact Elana Scraba, Assistant Director, Humanities Program, or Phill Campbell, Assistant Director, Math/Sciences Program:

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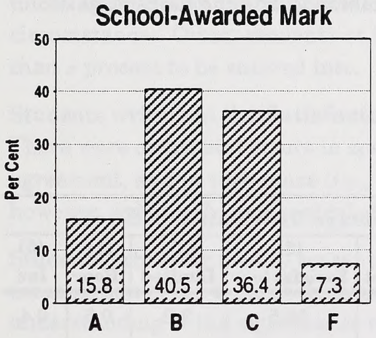
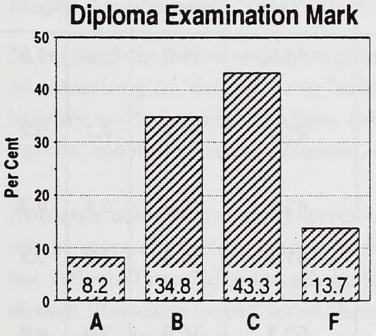
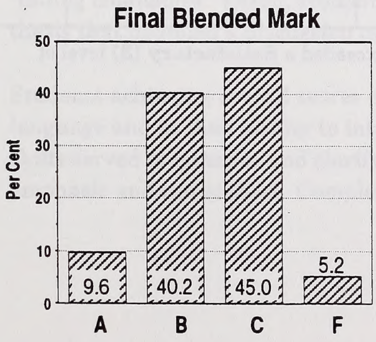
Section 1: January 1992 Examiners' Reports

English 30

Diploma Examination Results
Examiners' Report for January 1992







The summary information in this report provides teachers, school administrators, students, and the general public with an overview of results from the January 1992 administration of the English 30 Diploma Examination. The information is most helpful when used in conjunction with the detailed school and jurisdiction reports that have been mailed to schools and school jurisdiction offices. An annual provincial report containing a detailed analysis of the combined January, June, and August results will be available next fall.

Description of the Examination

The English 30 Diploma Examination consists of two parts: a written-response section and a multiple-choice section. Each part is worth 50% of the total examination mark.

Achievement of Standards

The information reported is based on the final blended marks achieved by 10 514 students who wrote the January 1992 examination.

- 94.8% of these students achieved the acceptable standard (a final blended mark of 50% or higher).
- 9.6% of these students achieved the standard of excellence (a final blended mark of 80% or higher).

The competence of students achieving the standard of excellence in writing in English 30 was impressive. However, skills demonstrated at the satisfactory level tended to be uneven; students showed ability on occasion to use language well but this was not always sustained.

Provincial Averages

- The average school-awarded mark was 66.1%.
- The average diploma examination mark was 62.4%.
- The average final blended mark, representing an equal weighting of the school-awarded mark and diploma examination marks, was 64.8%.

Part A: Written Response

Part A: Written Response is written at a different time from Part B: Reading. Students are required to complete two writing assignments related to the same piece of literature. Both assignments assess a variety of writing and thinking skills.

Readers will find the results most meaningful in the context of the assignments and the scoring descriptors. The most useful starting place for reviewing these results is at the **Satisfactory (3)** level. Such work exceeds the pass mark of 50%. The scoring guides that describe proficiency levels are in the *English 30 Diploma Examination Update for 1991,* which is available in all schools.

The table below outlines the requirements for each assignment, the categories for scoring each assignment, the amount each category contributes to the total mark (parts A and B combined), and the percentage of students achieving at the various levels.

Examination Blueprint and Percentage Distribution of Scores

Description of the Writing Assignment	Scoring Category	Proportion of Total Mark (%)	Percentage Distribution of Scores (5) Excellent	(4) Proficient	(3) Satisfactory	(2) Limited	(1) Poor	(0) Ins
Minor Assignment The student is required to write a personal response to the reading selection provided in the examination.	1. Thought and Detail	7.5	2.3	29.1	58.5	9.2	0.5	0.4
	2. Writing Skills	7.5	2.1	26.9	58.2	11.2	1.2	0.4
Major Assignment The major assignment maintains a thematic connection to the minor assignment. The student is required to demonstrate an appreciation of literary works studied through a discussion of theme and the literary techniques that support that theme. The student is also required to synthesize thoughts clearly and correctly in writing.	1. Total Impression	5.0	1.9	15.5	56.9	24.2	1.2	0.2
	2. Thought and Detail	12.5	1.9	16.2	47.3	32.2	2.1	0.2
	3. Organization	7.5	2.0	16.9	61.5	18.6	0.8	0.2
	4. Matters of Choice	5.0	2.0	20.1	61.1	15.4	1.3	0.2
	5. Matters of Convention	5.0	3.1	25.8	52.3	16.6	2.0	0.2

Note: The shaded portion represents the percentage of students who achieved or exceeded a **Satisfactory (3)** level of performance.

Examiners' Comments

Minor Assignment: Personal Response to Literature

The literature selection, an excerpt from the novella *The Secret Sharer,* presents a character who considers the nature of the challenge before him and his ability to meet that challenge.

Students identified readily with the topic of challenge, interpreting it as obstacle, goal, choice, test, situation, dream, motive, or achievement. The topic (challenge) has a moral aspect that prompted many students to respond in kind. Students achieving overall scores of **Satisfactory (3)** chose an appropriate quotation and usually illustrated or supported the quotation by describing an experience that required overcoming uncertainty, doubt, hostility, weakness, or fear. Challenges described were both voluntary and imposed by circumstances. Often, students at this level saw challenge as something to be beaten to the ground rather than a process to be entered into.

Students writing at the **Satisfactory (3)** level produced writing that is clear and simple in syntax. There were occasional errors in spelling and punctuation, subject-verb agreement, pronoun-antecedent agreement, and in verb tense (i.e., use of the past tense instead of the past perfect tense). Generally, however, writing showed control of conventions. Diction tended to be general rather than specific.

Students achieving overall scores of **Proficient (4)** and **Excellent (5)** usually offered a more thoughtful examination of the topic of challenge: sometimes an insight from a personal experience; sometimes a mature understanding of the significance of the topic in the greater scope of human experience. Many of these students discussed challenge of any kind as desirable, an opportunity for rewarding self-discovery.

Major Assignment: Literature Composition

In responding to the major assignment, students also interpreted challenge in a variety of ways, usually as something to "defeat" or to "achieve." They appeared to have had little difficulty in selecting appropriate literary works on which to base their discussion. They referred to a wide range of literature as well as to the current movie versions of *Hamlet, Henry V,* and *Lord of the Flies.*

Students achieving overall scores of **Satisfactory (3)** presented a clear controlling idea, often describing one or more characters who were faced with challenge. Sometimes it appeared that students at this level had not reflected carefully enough on the nature of challenge, the requirements of the assignment, and how their chosen literature would serve their purpose. Frequently, direct references to challenge were syntactically awkward when students were unsure of whether the concept was represented by a verb or a noun. For example, students referred to "unsuccessful challenges," "burdensome challenges," "aborted challenges," "failing challenges." Often, students dealt only with the topic (challenge generally) rather than offering a thesis that included a discussion of the author's purpose in presenting characters who face challenges.

Students achieving overall scores of **Proficient (4)** and **Excellent (5)** showed confidence in their use of language and in their ability to interpret insightfully both the assignment and the literature. Language skills served to enhance and clarify thought and detail. Repetition and parallelism were used to achieve emphasis and conciseness. Complex sentence structures contributed to effectiveness.

Question-by-Question Results

Question	Key	Difficulty*
1	D	56.4
2	B	75.6
3	C	87.8
4	B	58.8
5	D	72.4
6	C	74.5
7**	—	
8	B	41.1
9	B	69.2
10	D	76.7
11	A	78.7
12	D	66.1
13	B	93.0
14	D	65.2
15	B	78.3
16	A	81.0
17	C	51.7
18	C	85.3
19	B	83.5
20	B	69.6
21	D	65.8
22	A	68.9
23	B	58.5
24	C	50.2
25	C	79.4
26	A	74.7
27	D	64.0
28	A	36.6
29	A	39.2
30	D	81.9
31	A	48.4
32	C	61.9
33	D	47.6
34	D	73.0
35	B	68.6
36	B	65.1
37	A	69.9
38	C	62.0
39	C	33.5
40	D	56.6
41**	—	
42	A	61.2
43	A	80.3
44	D	74.2
45	A	63.7
46	A	71.1
47	D	70.3
48	A	77.7
49	C	51.3
50	C	69.1
51	B	62.8
52	A	50.6
53	D	32.9
54	A	45.2
55	D	54.9
56	B	48.8
57	B	57.6
58	C	63.1
59	B	54.5
60	D	80.2
61	D	45.9
62	C	76.9
63	B	65.7
64	A	39.9
65	C	71.1
66	B	68.5
67	C	33.7
68	D	52.4
69	D	68.9
70	B	72.8

* Difficulty—percentage of students answering the question correctly

** Questions 7 and 41 were dropped from the examination before mark calculations

Part B: Reading (Multiple Choice)

The table at the left shows question-by-question results and the keyed answers. Parallel tables in the school and jurisdiction reports show the percentage of students who selected each alternative. From this table, teachers can determine areas of strength and weakness in the achievement of their students relative to the province as a whole and, consequently, areas of strength and weakness in their own programs.

Examination Blueprint

	Classification by Thinking Skills			
Classification by Course Content	**Literal Understanding**	**Inference and Application**	**Evaluation**	**Totals**
1. Meanings	19, 20, 22, 28, 30, 43, 68	3, 5, 8, 16, 23, 24, 25, 26, 35, 37, 41*, 48, 66, 67, 70,	2, 7*, 10, 29, 45, 46, 52, 61 65	31 items (21%)
2. Critical Response		1, 4, 9, 11, 12, 15, 17, 21, 40, 42, 44, 47, 49, 53, 60, 64	13, 14, 31, 32, 34, 38, 69	23 items (17%)
3. Human Experience and Values		27, 39, 50, 51, 55, 56, 57, 59, 62, 63	6, 18, 33, 36, 54, 58	16 items (12%)
Totals	7 items (5%)	41 items (29%)	22 items (15%)	70 items (50%)

Note: questions 7 and 41 were deleted from the examination.

Subtest Results

Results are in average raw scores.

Total Part B: 45.5 out of 68

Subtest Results:*

Course Content

- Meanings: 19.1 out of 29
- Critical Response: 14.6 out of 23
- Human Experience and Values: 9.7 out of 16

* Readers are cautioned **not** to compare subtest results because the subtests are not of equal difficulty. Readers should compare these provincial subtest results with their own school results.

During the marking session, a committee of ten classroom teachers of English 30 reviewed the January 1992 English 30 Part B: Reading examination to determine whether the standards embedded in the readings and the questions were appropriate and fair. The committee members generally concurred that the examination set an appropriately demanding standard of achievement for graduating English 30 students. Some committee members expressed specific concern that the reading selections and questions contained vocabulary that would confound many students. Some of this concern was justified, as the results indicate. Questions 8, 29, 52, and 64 were cited as examples of questions that would be difficult for students with low vocabulary skills. In fact, the difficulty levels (percentage of students responding correctly) for these questions were 41.1%, 39.2% 50.6%, and 39.9% respectively, all considerably below the 66.9% average difficulty for the whole of Part B: Reading.

In the case of two questions, 7 and 41, teachers on the committee felt that there was more than one "correct" alternative. Item analysis proved their opinions to be valid. Questions 7 and 41 were deleted from the examination.

The following table gives results for three questions, the first of which was considered by the reviewing teachers to be very easy. For each question, three numbers are given: the percentage of all students writing the examination who chose the correct answer, the percentage of students achieving the **standard of excellence** (80% or higher, or A, on the whole examination) who chose the correct answer, and the percentage of students achieving the **acceptable standard** (but not receiving marks higher than 64%, or C, on the whole examination) who chose the correct answer. The comments following the table discuss some of the decisions that students may have made and some of the skills they may have used to answer these questions correctly.

Percentage of Students Correctly Answering Selected Multiple-Choice Questions

	Question Number		
Student Group	**40**	**67**	**70**
All students	56.6	33.7	72.8
Students achieving the standard of excellence (80% or higher, or A) on the whole examination	94.0	74.0	97.3
Students achieving the acceptable standard who received marks between 50% and 64%, or C, on the whole examination	43.4	21.9	67.2

Comments

40. The stage direction and speech in lines 146 to 148 serve to emphasize Joan's

A. aggressive manner
B. unrealistic hopes
C. overriding arrogance
• D. unwavering conviction

Question 40 is based on an excerpt from *Saint Joan* by George Bernard Shaw. It was assessed as a very easy question by the examination review committee (especially for students having any knowledge of Joan of Arc). However, only 56.6% of all students answered it correctly. The question refers to text very near the end of a four-page passage in which this inspired young woman has managed to gain an audience with the French captain who considers her plan to raise the seige of Orleans insane. The passage contains an abundance of stage directions, leaving little to the reader's imagination regarding the characters involved. Joan is earlier described (lines 109–110) as "very confident, very appealing, very hard to resist." Perhaps students neglected to give as much attention to the stage directions as to the dialogue, or perhaps they did not consider the frequent comments about the characters to be "stage" directions. Of the students who achieved the standard of excellence on the whole examination, (parts A and B combined), 94.0% answered correctly; of those who achieved marks between 50% and 64% (a letter grade of C) on the whole examination, 43.4% chose the correct alternative. In this same group (those students achieving marks between 50% and 64%), 34.1% chose alternative A, and 16.7% chose alternative C, seeing Joan as aggressive and arrogant, a more literal view of her "simplicity." Perhaps these students were unfamiliar with the meaning of the word "conviction."

Questions 67 and 70 are from a set of questions based on the poem "Morning Glory" by Patrick White.

67. The speaker suggests that the survival of many domestic plants is based solely on the fact that

A. life is universally respected
B. variety is necessary in nature
• C. they are useful to the gardener
D. they are more numerous than weeds

Question 67 proved to be very difficult (33.7% of students chose the correct alternative), and it discriminated very well between high-scoring students and students scoring at the satisfactory level. The question required a close reading of the whole poem since line references were not provided. It seems that many students may have missed the qualifier "domestic" in the question, failing to make the connection with the key word "usefulness" in line 20. Of the students who achieved the standard of excellence on the whole examination (parts A and B combined), 74.0% chose the correct alternative. Of those who achieved marks between 50% and 64% on the whole examination, 21.9% answered correctly. Alternatives A and B respectively were selected by 34.6% and 32.6% of students achieving marks between 50% and 64%. Students may have failed to recognize that lines 11 to 20 are the speaker's rationale for "weeding."

70. The final line of the poem, "And like a tired roman know an empire over-run," suggests that the speaker

A. resents the morning glory's presence
• B. recognizes the morning glory's indomitable vigor
C. values the stately appearance of the morning glory
D. sees himself successfully defeating the morning glory

Question 70 was answered correctly by 72.8% of all students. This result is a measure of how well students understood the poem and, therefore, the speaker's attitude. The poem is challenging in that the speaker praises the Morning Glory as a "green enthusiast," while reluctantly weeding it from his garden.

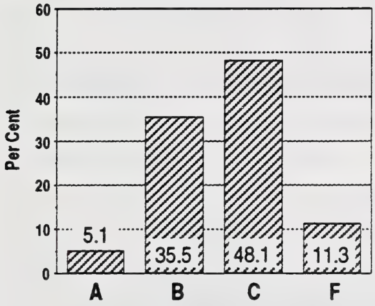
Of the students who achieved the standard of excellence on the whole examination (parts A and B combined), 97.3% answered correctly. Of those who achieved marks between 50% and 64% on the whole examination, 67.2% answered correctly. Students seemed to have little problem recognizing the central tension in the poem.

For further information, contact Gail Gates, Tom Dunn, or Elana Scraba at the Student Evaluation Branch, 427-0010.

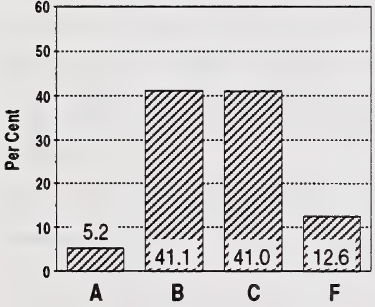
English 33

Diploma Examination Results
Examiners' Report for January 1992

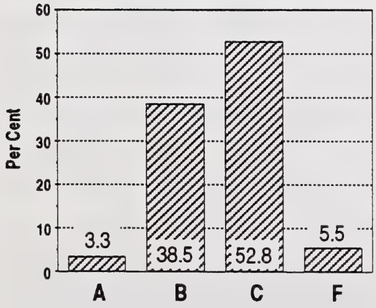
School-Awarded Mark



Diploma Examination Mark



Final Blended Mark



The summary information in this report provides teachers, school administrators, students, and the general public with an overview of results from the January 1992 administration of the English 33 Diploma Examination. The information is most helpful when used in conjunction with the detailed school and jurisdiction reports that have been mailed to schools and school jurisdiction offices. An annual provincial report containing a detailed analysis of the combined January, June, and August results will be available next fall.

Description of the Examination

The English 33 Diploma Examination consists of two parts: a written-response section and a multiple-choice section. Each part is worth 50% of the total examination mark.

Achievement of Standards

The information reported is based on the final blended marks achieved by 4 090 students who wrote the January 1992 examination.

- 94.5% of these students achieved the acceptable standard (a final blended mark of 50% or higher).
- 3.3% of these students achieved the standard of excellence (a final blended mark of 80% or higher).

Provincial Averages

- The average school-awarded mark was 61.3%.
- The average diploma examination mark was 62.7%.
- The average final blended mark, representing an equal weighting of the school-awarded mark and diploma examination marks, was 62.5%.

Part A: Written Response

Part A: Written Response is written at a different time from Part B: Reading (Multiple Choice). Students are required to complete three writing assignments, each of which assesses a variety of writing and thinking skills.

Readers will find the results most meaningful in the context of the assignments and the scoring descriptors. The most useful starting place for reviewing these results is at the **Satisfactory (3)** level. Such work exceeds the pass mark of 50%. The scoring guides that describe proficiency levels are in the *English 33 Diploma Examination Update for 1991,* which is available in all schools.

The table below outlines the requirements for each assignment, the categories for scoring each assignment, the amount each category contributes to the total mark (parts A and B combined), and the percentage of students achieving at the various levels.

Examination Blueprint and Percentage Distribution of Scores

Description of the Writing Assignment	Scoring Category	Proportion of Total Mark (%)	Percentage Distribution of Scores					
			(5) Excellent	(4) Proficient	(3) Satisfactory	(2) Limited	(1) Poor	(0) Ins
Personal Response to Literature The student is required to discuss an aspect of literature from a personal perspective.	1. Thought and Detail	10.0	1.2	20.6	56.0	20.0	1.8	0.4
	2. Organization	5.0	1.3	19.5	62.4	15.6	0.9	0.4
	3. Matters of Choice	5.0	1.3	17.1	65.5	14.5	1.2	0.4
	4. Matters of Convention	5.0	1.9	23.8	56.0	16.3	1.7	0.4
Functional Writing The assignment is functional in nature. The student is required to write about a given situation.	1. Thought and Detail	10.0	1.2	21.8	60.2	16.0	0.6	0.2
	2. Organization	2.5	1.1	19.9	65.6	13.0	0.2	0.2
	3. Writing Skills	2.5	1.0	16.9	64.2	16.5	1.3	0.2
Response to Visual Communication The writing assignment is connected to one or more photographs and/or cartoons. The student is required to write about main ideas and techniques of visual communication.	1. Thought and Detail	5.0	0.5	9.0	48.4	37.6	3.3	1.3
	2. Organization	2.5	0.4	7.9	56.8	31.2	2.3	1.3
	3. Writing Skills	2.5	0.6	11.0	62.0	22.7	2.3	1.3

Note: The shaded portion represents the percentage of students who achieved or exceeded a **Satisfactory** level of performance.

Examiners' Comments

The excerpt from *The Little Prince* in the Personal Response to Literature assignment required a challenging level of abstract thought on the student's part, and many students were able to relate the topic to meaningful aspects of their personal and literary experience. Students elaborated on such themes as "the creation of relationships is fundamental to the personal quality of life," "establishing relationships is imperative in helping a person prevail over life's difficulties," and, "when life is seen through the eyes of shared memories and moments, it becomes vividly colourful and wonderful." The majority of the students gave a personal anecdotal response to the assignment.

Improvement in organization, particularly in the use of transitions and in the arrangement of ideas, was noted. This was not accompanied, however, by a similar improvement in mechanics and grammar. Some of the errors in matters of convention seemed to stem from carelessness, and students should be advised of the necessity of editing their work.

Many students achieving the acceptable standard responded to the selection at the literal level and wrote about topics such as school friendships, infatuation, and dating. Although these students often provided an elaborate account of the circumstances leading up to the establishment of their special relationship, they did not follow this with a discussion of how their lives were made more meaningful.

Students achieving the standard of excellence responded to the universal implications of the selection and explored such topics as "the complexities of human needs" and "the necessity to trust others in order to be free to live and to love." Some students presented the idea that life is not made meaningful by establishing ties. These students described the devastation that can result from a failed relationship and the negative consequences of establishing ties, such as a greater dependency on others. Students used quotations from the reading selection judiciously and, in many instances, perceptively. Many students referred to other literature they had studied; some students commented on the thematic importance of "loneliness" in literature.

Most students provided satisfactory responses on the **Functional Writing** assignment, which required students to write a letter inviting former Nalwen Composite High School students to the school's 10th anniversary celebration. The topic enabled students to be creative and allowed for a wide range of responses. Most students used an appropriate tone; the best responses were those in which an enthusiastic tone served to encourage attendance at the anniversary celebration. The students were provided with fewer specific details in the assignment; this had the desired effect, in many instances, of producing work that was imaginative and personal in nature. Students achieving the acceptable standard used information supplied in the assignment without elaboration. The letters written by students achieving the standard of excellence were enhanced by the use of precise, thoughtfully chosen and imaginative details. In this particular Functional Writing assignment, some students did not consider all the information provided. For example, a number of students used incorrect dates for the anniversary celebration. They were not penalized in this instance; however, in future, students should be aware that they must carefully consider the given information and use it accurately.

The photograph in the **Response to Visual Communication** section depicts a night scene at the Canadian National Exhibition in Toronto. In the foreground, a sharply focused smiling man is holding a laughing child aloft in the palm of his hand, while crowds and a brightly lit ferris wheel form a blurred background. This significant human moment was perceptively discussed by many students. It is encouraging to note that in the Response to Visual Communication assignment, many students wrote unified compositions of high quality; many students attempted to analyse the photographer's message and its visual impact.

Students achieving the acceptable standard of performance tended to interpret the photograph in a conventional way, using generalized details for support. These students often wrote about the fun that young and old alike enjoy at the fair. Many students observed that the photographer focused on the man and the child.

Students achieving the standard of excellence handled the thematic aspects of the photograph well, presenting insightful interpretations. The photograph elicited responses such as "The baby symbolizes the frailty of the inexperienced; the father represents love and trust." These students discussed the photographer's choices in an articulate, perceptive manner. They noted, for example, the photographer's intentional blurring of the background to illustrate how inconsequential everything else is in comparison to the love shared by the man and child, and the photographer's capturing, in the background, enough of the setting to set the stage for the fairground drama.

Part B: Reading (Multiple Choice)

Results

Results are in average raw scores.

Total Part B: 46.0 out of 70

Subtest Results:*

- Course Content
  - -Main Ideas/Details: 18.8 out of 30
  - -Relationship Between Form and Content: 11.1 out of 17
  - -Human Experience and Values: 10.9 out of 16
  - -Knowledge of Revision and Editing: 5.2 out of 7

* Readers are cautioned **not** to compare subtest results because the subtests are not of equal difficulty. Readers should compare these provincial subtest results with their own school results.

Examination Blueprint

	Classification by Thinking Skills			
Classification by Course Content	**Literal Understanding**	**Inference and Application**	**Evaluation**	**Totals**
Main Ideas/ Details	27, 28, 29	13, 22, 26, 30, 32, 40, 44, 46, 51, 52, 55, 56, 59, 62, 65, 66, 68, 69, 70	9, 17, 18, 20, 23, 25, 31, 41	30 items (21%)
Relationship Between Form and Content	14, 24	10, 16, 47, 48, 54, 57, 58, 60, 61, 63, 64	8, 42, 43, 67	17 items (12%)
Human Experience and Values		2, 6, 7, 12, 15, 19, 21, 49, 50, 53	1, 3, 4, 5, 11, 45	16 items (12%)
Knowledge of Revision and Editing	34, 37	33, 35, 36, 38	39	7 items (5%)
Totals	7 items (5%)	44 items (32%)	19 items (13%)	70 items (50%)

Question-by-Question Results

Question	Key	Difficulty*
1	B	79.1
2	D	85.6
3	A	87.3
4	D	57.5
5	D	80.6
6	C	64.5
7	C	93.0
8	C	45.2
9	D	77.6
10	D	67.1
11	A	51.8
12	D	45.8
13	B	50.6
14	C	53.3
15	D	83.2
16	A	43.5
17	D	57.9
18	B	60.7
19	C	54.2
20	A	71.5
21	C	59.5
22	B	60.5
23	D	65.8
24	A	75.0
25	C	41.5
26	C	79.5
27	A	76.1
28	C	48.4
29	B	80.1
30	D	62.7
31	B	69.4
32	D	88.1
33	D	82.4
34	A	65.6
35	B	87.8
36	C	81.4
37	C	74.0
38	C	72.2
39	B	58.9
40	A	75.6
41	C	48.4
42	A	76.6
43	A	73.1
44	A	44.4
45	C	70.3
46	B	52.0
47	B	72.1
48	A	70.5
49	C	48.3
50	C	59.3
51	B	54.5
52	D	68.5
53	B	67.7
54	A	62.2
55	D	59.6
56	A	47.0
57	D	46.0
58	D	72.6
59	B	60.7
60	C	70.7
61	B	76.2
62	D	70.8
63	A	45.1
64	A	84.5
65	D	50.5
66	B	67.0
67	A	73.3
68	B	65.9
69	A	52.2
70	B	76.1

* Difficulty—percentage of students answering the question correctly

The table at the left shows question-by-question results and the keyed answers. Parallel tables in the school and jurisdiction reports show the percentage of students selecting each alternative. From this table, teachers can determine areas of strength and weakness in the achievement of their students relative to the province as a whole and, consequently, areas of strength and weakness in their programs.

The table below relates to four questions selected from the examination. For each question, three statistical references are given: the percentage of all students writing the examination who chose the correct answer, the percentage of students achieving the **standard of excellence** (80% or higher, or A, on the whole examination) who chose the correct answer, and the percentage of students achieving the **acceptable standard** (but not receiving marks higher than 64%, or C, on the whole examination) who chose the correct answer. The comments following the table discuss some of the decisions that students made and some of the skills that they used to answer correctly.

Percentage of Students Correctly Answering Selected Questions (Part A and B combined)

	Question Number			
Student Group	**6**	**20**	**24**	**35**
All students	64.5	71.5	75.0	87.8
Students achieving the standard of excellence (80% or higher, or A) on the whole examination	82.2	92.1	82.7	93.5
Students achieving the acceptable standard who received marks between 50% and 64%, or C, on the whole examination	59.4	67.9	73.7	87.1

6. The narrator turns her back when she thinks Bill is about to leave a tip for her (lines 93-94). This shows that she is

   A. rude
   B. insecure
   ● C. discreet
   D. confident

Some teachers believed that **question 6** would pose great difficulty because the keyed response "discreet" was not within English 33 students' range of knowledge and understanding.

The question was relatively easy, however, with 64.5% of all students answering correctly: 82.2% of the students achieving the standard of excellence chose the correct alternative, and 59.4% of the students achieving marks between 50% and 64% answered correctly. Clearly, the word "discreet" is within the lexicon of English 33 students.
As well, it is apparent that the students understood the nature of the narrator's character in order to successfully interpret the question.

20. The dialogue between Don Quixote and Sancho Panza in lines 96 to 110 reveals that Sancho Panza's MAIN interest in travelling with Don Quixote is to

● A. acquire riches and status
B. escape from his nagging wife
C. experience adventure and freedom
D. provide protection for Don Quixote

In **question 20,** students were given a fairly lengthy line reference to aid them in discerning Sancho Panza's interest in travelling with Don Quixote. As predicted by some teachers, students who did not take the time to check the line reference were incorrectly drawn to alternative B. Without a careful re-reading of the cited lines, these students attributed the closing remarks of Sancho Panza's nagging wife as the primary force in his decisin to accompany Don Quixote. Although 71.5% of the students chose the correct response, alternative B attracted only 6.1% of the students achieving the standard of excellence; 17.7% of the students achieving the acceptable standard were drawn to alternative B.

24. According to George Iny, a person who drives mainly in the city should buy a car that is

● A. compact
B. full-sized
C. sub-compact
D. intermediate-sized

Although most teachers who reviewed the examination felt that **question 24** would be a very easy question, they predicted that some students would not re-read the selection to confirm their answer. A reference in the article to sub-compacts being "just the ticket for nipping in and out of tight parking spots around town" lured those students who did not take the time to check the article more thoroughly to find Iny's actual recommendation. It is interesting to note that the tendency to jump to a conclusion was more pronounced in the students achieving the standard of excellence. Although 82.7% of this group chose the correct response, 16.8 % were drawn to alternative C. Of the students achieving marks between 50% and 64%, 73.7% chose the correct response and 14.8% were drawn to alternative C. Of the students failing the examination, 56.2% chose the correct answer and 15.7% selected alternative C.

35. In paragraph 2, Robin changes "many" to "35,000" in order to achieve

A. appropriate tone
● B. specificity
C. transition
D. coherence

The word "specificity" as the keyed response in **question 35** was identified by some teachers as being too difficult for English 33 students. In fact, an overwhelming number of students, 87.8%, answered correctly. Students achieving the standard of excellence did very well on this question: 93.5% chose the correct alternative. Of the students achieving the acceptable standard, 87.1% responded correctly. Of the students failing the examination, 69.3% answered correctly. This suggests that students were able to isolate the root word "specific" and apply it to the situation with relative ease.

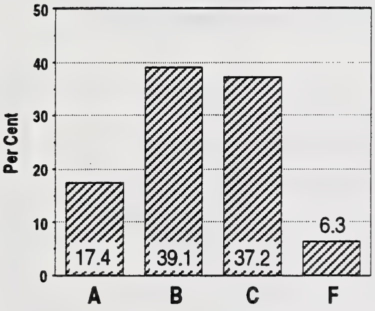
In questions 33 to 39, students were required to make decisions about Robin's revisions to the first draft of her letter. The questions were, on the whole, fairly easy for the students. It is encouraging to note that students understood the rationale behind Robins's revisions in areas such as tone, diction, and conventions.

For further information, contact Gloria Malick, Tom Dunn, or Elana Scraba at the Student Evaluation Branch, 427-0010.

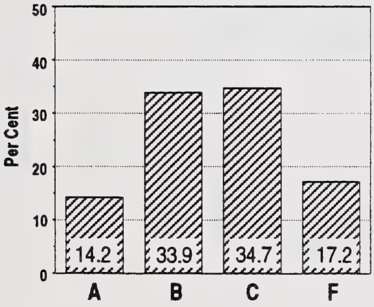
Social Studies 30

Diploma Examination Results
Examiners' Report for January 1992

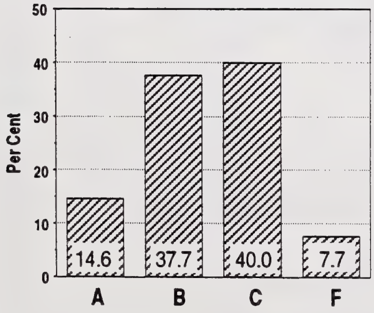
School-Awarded Mark



Diploma Examination Mark



Final Blended Mark



The summary information in this report provides teachers, school administrators, students, and the general public with an overview of results from the January 1992 administration of the Social Studies 30 Diploma Examination. The information is most helpful when used in conjunction with the detailed school and jurisdiction reports that have been mailed to schools and school jurisdiction offices. An annual provincial report containing a detailed analysis of the combined January, June, and August results will be available next fall.

Description of the Examination

The Social Studies 30 Diploma Examination consists of two parts: a multiple-choice section worth 70% and a written-response section worth 30% of the total examination mark.

Achievement of Standards

The information reported is based on the final blended marks achieved by 8 696 students who wrote the January 1992 examination.

- 92.3% of these students achieved the acceptable standard (a final blended mark of 50% or higher).
- 14.6% of these students achieved the standard of excellence (a final blended mark of 80% or higher).

Overall, student achievement in Social Studies 30 was satisfactory. Students demonstrated a good grasp of social studies knowledge. They continued to improve in their writing, which required students to integrate concepts and apply them to social studies issues.

Provincial Averages

- The average school-awarded mark was 66.7%.
- The average diploma examination mark was 63.4%.
- The average final blended mark, representing an equal weighting of the school-awarded and diploma examination marks, was 65.4%.

Part A: Multiple Choice

Examination Blueprint

Part A: Multiple Choice has a value of 70 marks, one mark for each multiple-choice question. Each question is classified in two ways: according to the curricular content area (topic) being tested and according to the knowledge and skill objectives called forth by the question. The examination blueprint illustrates the distribution of questions in January 1992 according to these classifications.

All questions on the diploma examination require students to demonstrate knowledge of social studies content and to apply social studies skills to that knowledge base. The reporting categories below define the general types of questions that appear on the examination and the categories for which information is reported.

		Question Classification by Topic		**Total Questions**
		Topic A: Political and Economic Systems	**Topic B: Global Interaction in the 20th Century**	
		Knowledge and application of facts, concepts, and generalizations related to the world's political and economic systems as outlined in the *Program of Studies.*	Knowledge and application of facts, concepts, and generalizations related to the interaction among nations since 1918 as outlined in the *Program of Studies.*	
Question Classification by Knowledge and Skill Objectives	**Comprehension of Information and Ideas** These questions require students to demonstrate their knowledge and understanding of generalizations, key concepts, and facts related to social studies content.	1, 2, 8, 13, 16, 19, 21, 25, 26, 27, 28, 35	40, 41, 48, 49, 52, 56, 57, 58, 59, 67, 68, 70	24
	Interpretation and Analysis of Information and Ideas These questions require students to demonstrate their knowledge of social studies content by interpreting and analysing information and ideas.	5, 7, 9, 10, 11, 18, 20, 22, 24, 31, 33	36, 38, 44, 46, 47, 50, 53, 54, 60, 62, 64, 69	23
	Synthesis and Evaluation of Information and Ideas These questions require students to demonstrate and apply their knowledge of social studies content by synthesizing information and ideas and evaluating their accuracy and worth.	3, 4, 6, 12, 14, 15, 17, 23, 29, 30, 32, 34	37, 39, 42, 43, 45, 51, 55, 61, 63, 65, 66	23
	Total Questions	**35**	**35**	**70**

Results

Results are reported in average raw scores. Total Part A: 46.5 out of 70. Subtest results for Part A:*

- **by Topic**
  - Political and Economic Systems: 23.2 out of 35
  - Global Interaction in the 20th Century: 23.3 out of 35
- **by Knowledge and Skill Objectives**
  - Comprehension of Information and Ideas: 14.7 out of 24
  - Interpretation and Analysis of Information and Ideas: 15.9 out of 23
  - Synthesis and Evaluation of Information and Ideas: 15.9 out of 23

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*Readers are cautioned **not** to compare subtest results because the subtests are not of equal difficulty. Readers should compare these provincial subtest results with their own school results.

Question-by-Question Results

Question	Key	Difficulty*
1	D	58.9
2	A	41.2
3	D	87.6
4	A	60.4
5	C	67.8
6	D	70.8
7	B	65.3
8	D	67.5
9	B	77.3
10	A	84.3
11	C	85.3
12	A	59.0
13	B	41.1
14	D	82.4
15	B	49.4
16	D	51.8
17	B	66.0
18	C	75.4
19	B	71.3
20	D	78.7
21	D	48.1
22	C	50.1
23	C	83.7
24	D	80.0
25	D	79.9
26	B	68.6
27	C	73.8
28	D	56.0
29	C	78.3
30	C	47.6
31	A	49.1
32	D	74.1
33	A	58.1
34	B	61.8
35	B	73.7
36	A	74.0
37	A	76.4
38	C	46.0
39	D	70.8
40	C	43.1
41	B	58.8
42	B	63.7
43	D	70.0
44	A	61.2
45	C	83.8
46	D	52.9
47	A	71.4
48	B	69.3
49	A	57.0
50	C	68.9
51	C	82.6
52	D	73.2
53	D	73.7
54	B	65.2
55	A	60.2
56	C	45.4
57	D	85.3
58	A	67.0
59	B	66.9
60	D	78.4
61	B	70.3
62	B	83.7
63	A	75.1
64	A	75.3
65	C	81.8
66	A	34.3
67	C	51.9
68	B	59.2
69	D	68.2
70	A	62.6

*Difficulty—percentage of students answering the question correctly

The table on the left shows question-by-question results and the keyed answers. Parallel tables in the school and jurisdiction reports show the percentage of students who selected each alternative. Comparison of school results with provincial results may show areas of strength and weakness in instructional programs.

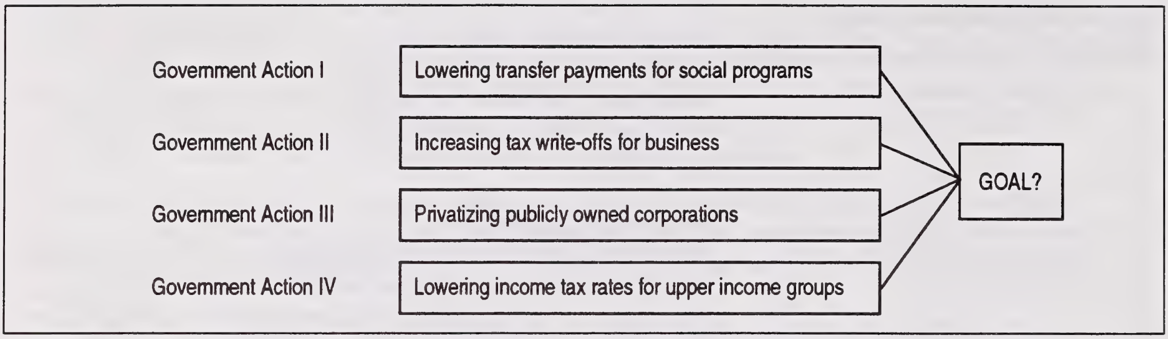
Examiners' Comments

The multiple-choice section of the examination requires students to go beyond simply recalling information and to apply their knowledge and thinking skills. Students must demonstrate that they understand social studies concepts; that they comprehend historical, political, and economic relationships; and that they can interpret and evaluate social studies information and ideas.

The following table gives results for five questions selected from the examination. For each question, three statistical references are given: the percentage of students writing the examination who chose the correct answer, the percentage of students achieving the **standard of excellence** (80% or higher, or A, on the whole examination) who chose the correct answer, and the percentage of students achieving the **acceptable standard** (but not receiving marks higher than 64%, or C, on the whole examination) who chose the correct answer. The comments following the table discuss some of the decisions that students may have made and some of the skills they may have used to answer correctly.

Percentage of Students Correctly Answering Selected Multiple-Choice Questions

	Question Number				
Student Group	**30**	**31**	**32**	**49**	**69**
All students	47.6	49.1	74.1	57.0	68.2
Students achieving the standard of excellence (80% or higher, or A) on the whole examination	74.7	82.2	96.3	95.7	95.8
Students achieving the acceptable standard who received marks between 50% and 64%, or C, on the whole examination	38.6	37.6	67.6	42.0	59.2


Government Action I
Lowering transfer payments for social programs
Government Action II
Increasing tax write-offs for business
Government Action III
Privatizing publicly owned corporations
Government Action IV
Lowering income tax rates for upper income groups
GOAL?

Questions 30, 31, and 32 followed a diagram showing four different government economic actions. Students needed to interpret, to analyse, and to evaluate these government actions in order to determine the best answers. For many students, questions 30 and 31 proved to be more difficult than Question 32.

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30. To a supporter of a market-oriented economy, all four government actions are appropriate in order to achieve the goal of

A. restricting free trade
B. expanding the money supply
● **C.** creating a positive investment climate
D. controlling an inflationary economic boom

To answer **Question 30** correctly, students had to assume a particular ideological perspective and then determine the goal associated with the set of government actions given in the diagram. To be able to do this, students had to understand the consequences of each action and relate these consequences to the achievement of a common goal. Many students found this question difficult; 52% chose incorrect responses. However, 75% of the students achieving the standard of excellence on the total examination answered Question 30 correctly.

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31. What relationship exists among these government actions?

● **A.** Actions I and III will likely pay for much of the cost of actions II and IV.
B. Actions I and IV will likely reduce the economic impact of actions II and III.
C. Action IV is the result of actions II and III.
D. Action III is caused by actions I and IV.

Question 31 asked students to determine a relationship among the four government actions. This was difficult for many students. They had to compare the cause-and-effect relationship of certain government actions and, in particular, the impact these actions can have on one another. For example, the student had to recognize that the costs to the government of increasing tax write-offs and lowering income taxes may be offset by decreasing transfer payments and by privatization. Of the students achieving the standard of excellence on the total examination, 82% were able to correctly identify the relationship, and 38% of the students achieving total examination scores between 50% and 64% were able to do so. Just over 50% of all students were unable to determine the relationship among the government actions.

32. Who would strongly disagree with the four government actions?

A. An entrepreneur starting a new enterprise
B. A broker looking for new stock opportunities
C. A conservative voter committed to laissez-faire
● D. A social democrat concerned about poverty levels

Question 32 asked students to evaluate the results of the government actions from the point of view of four different individuals. Based on their knowledge of these points of view, students had to decide which individual would strongly disagree with the actions. Many students (74%) used their evaluation skills to identify the correct answer. In fact, 96% of the students achieving the standard of excellence on the total examination answered correctly, as did 68% of the students whose total examination scores were between 50% and 64%.

49. The principle of national sovereignty was violated by Germany before the Second World War when

● A. German forces occupied Czechoslovakia
B. German forces remilitarized the Rhineland
C. Germany stopped making reparation payments
D. Germany withdrew from the League of Nations

Question 49 tested students' ability to apply their knowledge of certain historical events to the concept of national sovereignty. Many students (26%) incorrectly identified Germany's remilitarization of the Rhineland as a violation of national sovereignty, perhaps assuming that the Rhineland was not part of Germany. However, 96% of the students achieving the standard of excellence on the total examination and 42% of the students achieving total examination scores between 50% and 64% answered this question correctly.

69. Which leader's policy is **inconsistent** with the action taken?

	LEADER	POLICY	ACTION
A.	KHRUSHCHEV	PEACEFUL COEXISTENCE	INSTALLATION OF A "HOT LINE" BETWEEN MOSCOW AND WASHINGTON
B.	JOHNSON	CONTAINMENT	INCREASE IN U.S. COMBAT TROOP STRENGTH IN VIETNAM
C.	REAGAN	DETERRENCE	COMMITMENT TO "STAR WARS" RESEARCH
● D.	BREZHNEV	DÉTENTE	ESTABLISHMENT OF PRO-COMMUNIST FORCES IN AFGHANISTAN

Question 69 asked students to identify an inconsistent relationship between a leader's policy and action. Students had to recall and apply their knowledge of information concerning the Cold War. This question was not difficult for most students. Of those achieving the standard of excellence on the total examination, 96% answered correctly, as did 59% of the students achieving total examination scores between 50% and 64%.

Part B: Written Response

The results for the written-response section of the Social Studies 30 Diploma Examination are tabulated according to the percentage of students achieving at each level (1 to 5) in each of the scoring categories. Each scoring category assesses somewhat different skills; consequently, individual student's scores are likely to vary from one category to another. Those students who achieve at or above the standard of excellence (80%) on the written-response section have scores of **Proficient (4)** or **Excellent (5)** on all scoring categories. Students just meeting the acceptable standard (50%) on the written-response section have scores of **Satisfactory (3)** on some scoring categories but produce **Limited (2)** work in other categories. Students who produce **Satisfactory (3)** work for **all** scoring categories receive scores of 18 out of 30 on Part B.

Readers will find the results most meaningful in the context of the assignment and the scoring descriptors. The most useful starting place for reviewing these results is at the **Satisfactory (3)** level. The scoring guides that describe proficiency levels are in the *Diploma Examinations Program Update, Social Studies 30, 1991-92 School Year.*

Examination Blueprint and Percentage Distribution of Scores

The written-response section contributes 30% of the examination mark. Students are required to write one complete and unified essay in which they define the scope of an issue and rationally defend their position through the application of supportive evidence with respect to the issue. The organization of arguments should show evidence of logical thought that is persuasive for the reader. Students are expected to make use of critical and creative thinking skills to demonstrate complex and independent thought.

Part B: Written Response has a total value of 30 marks: 10 marks each for Defence of Position and Presentation of Examples and five marks each for Definition of the Issue and Quality of Language and Expression.

Scoring Category	**Proportion of Total Mark (%)**	**Percentage Distribution of Scores**					
		(5) Excellent	**(4) Proficient**	**(3) Satisfactory**	**(2) Limited**	**(1) Poor**	**Ins**
1. Definition of the Issue	5	1.7	14.1	44.4	34.7	4.8	0.2
2. Defence of Position	10	2.2	16.9	48.1	30.4	2.3	0.2
3. Presentation of Examples	10	1.7	13.6	40.4	37.3	6.8	0.2
4. Quality of Language and Expression	5	2.2	19.1	64.3	13.5	0.7	0.2

Note: The shaded portion represents the percentage of students who achieved or exceeded a **(3) Satisfactory** level of performance.

Examiners' Comments

The results of the written component of the January 1992 examination, while down slightly when compared with results in 1991, continue to show increases over results from 1990 and earlier. Changes to the scoring criteria made in 1991 encourage students to compose more organized, fluent, and interesting essays, and to write in a less contrived or pedestrian manner. Many markers and those teachers involved in standards confirmation commented that more students are effectively integrating key social studies vocabulary and current events examples into the fabric of their writing.

Students achieving a satisfactory level were able to express an adequate understanding of the complexity of an issue, but many students falling short of satisfactory writing continued to exhibit difficulty in defining the nature of the disagreement raised by an issue. Such writers may take a position but pay only cursory attention to the assumptions and principles underlying the different viewpoints associated with an issue. It was encouraging to see, however, that fewer students assigned a simplistic, two-valued approach to this task in the assignment.

Many markers, including teachers who confirmed standards, felt that students generally continued to demonstrate an awareness that a better argumentative paper is developed by using a variety of approaches. Convincing argumentation through the application of relevant historical and contemporary evidence is becoming more prevalent. While more papers could be further strengthened by a greater effort to refute opposing arguments, there is much less evidence of students drifting away from the issue under discussion. More students writing at the satisfactory level or better are taking a qualified position, revealing an awareness of the dangers of perceiving an issue entirely in absolute, unequivocal terms. Many students falling short of satisfactory writing, however, continue to present superficial descriptions of detail only vaguely related to an issue, preferring instead to have the reader sort out evidence that matters from that which is superfluous. Such writers will often choose, as well, to present supportive evidence that is so overgeneralized that any attempt at specificity does not succeed. Writing that presents a shallow, nonanalytical approach received lower scores.

It was also encouraging to see that, as in January and June 1991, many students selected their evidence from appropriate social studies content and relevant current events. Many students choosing to write on Topic A purposefully developed evidence from the realm of contemporary information. For example, many students made an interesting comparison between media coverage of the recent Gulf War and that of the war in Vietnam. A number of students also referred to the current controversy regarding the release of information and the assassination of President Kennedy. Many Topic B papers accurately focused upon the implications for world arms reduction and disarmament as a result of the dissolution of the Soviet Union and the end of the Cold War. Many students writing on Topic B also adroitly integrated into their discussion information from the multiple-choice section of the examination.

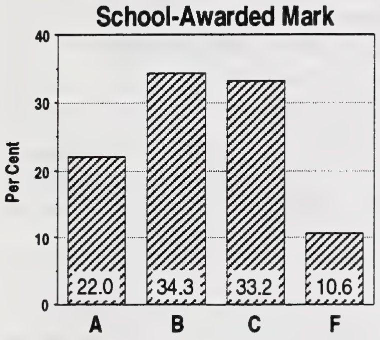
A number of students falling short of satisfactory writing unsuccessfully attempted to create arguments based on general assertions or hypothetical situations rather than on actual examples. More sophisticated writers quite effectively developed their supportive evidence from a theoretical or metaphorical perspective. Some students presenting limited or poor writing in dealing with Topic A attempted to fit essentially economic arguments into an issue that was political in nature. Such students, in dealing with Topic B, differentiated inappropriately the concepts of disarmament and arms reduction or equated disarmament solely with nuclear weapons rather than including conventional weapons. Excellent and proficient writers carefully made these distinctions, using specific evidence such as the SALT or START talks. A number of writers on Topic A developed fairly detailed descriptions of the various techniques of dictatorship and democracy without successfully focusing on the issue of freedom of information. Such writing received Limited or Poor scores.

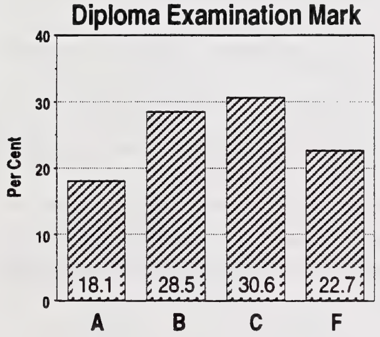
Despite these reservations and the fact that more students chose to write on Topic B, many perceptive and insightful papers were written on both topics.

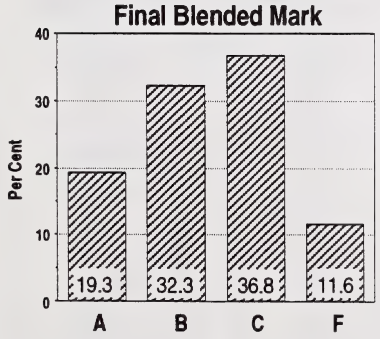
For further information, contact Barry Jonas, Tom Dunn, or Elana Scraba at the Student Evaluation Branch, 427–0010.

Mathematics 30

Diploma Examination Results
Examiners' Report for January 1992







The summary information in this report provides teachers, school administrators, students, and the general public with an overview of results from the January 1992 administration of the Mathematics 30 Diploma Examination. This information is most helpful when used in conjunction with the detailed school and jurisdiction reports that have been mailed to schools and school jurisdiction offices. An annual provincial report containing a detailed analysis of the combined January, June, and August results will be available this fall.

Description of the Examination

The Mathematics 30 Diploma Examination consists of three parts: a multiple-choice section of 40 questions worth 60%, a numerical-response section of 7 questions worth 10%, and a written-response section of 4 questions worth 30% of the total examination mark.

Achievement of Standards

The information reported is based on the final blended marks achieved by 9 233 students who wrote the January 1992 examination.

- 88.4% of these students achieved the acceptable standard (a final blended mark of 50% or higher).
- 19.3% of these students achieved the standard of excellence (a final blended mark of 80% or higher).

Provincial Averages

- The average school-awarded mark was 66.9%.
- The average diploma examination mark was 63.3%.
- The average final blended mark, representing an equal weighting of the school-awarded and diploma examination marks, was 65.5%.

Results and Examiners' Comments

Subtest

When analysing any detailed examination results, please bear in mind that subtest results **cannot** be directly compared.

Results are in average raw scores.

Machine scored: 29.9 out of 47

Written response: 12.4 out of 20

- **Course Content**
  - -Polynomial Functions: 4.9 out of 8
  - -Trigonometric and Circular Functions: 7.7 out of 13
  - -Statistics: 8.5 out of 13
  - -Quadratic Relations: 4.8 out of 8
  - -Exponential and Logarithmic Functions: 5.4 out of 8
  - -Permutations and Combinations: 5.1 out of 8
  - -Sequences and Series: 5.9 out of 9
- **Cognitive Levels**
  - -Knowledge: 3.1 out of 5
  - -Comprehension: 10.8 out of 15
  - -Application: 25.3 out of 40
  - -Higher Mental Activities: 3.1 out of 7

Examination Blueprint

Each question on the examination is classified in two ways: according to the curricular content area being tested and according to the cognitive level demanded by the question. The examination blueprint illustrates the distribution of questions in January 1992 according to these classifications. Numbers in brackets [ ] indicate written-response questions, those in parentheses ( ) indicate numerical-response questions, and those without brackets or parentheses indicate multiple-choice questions.

	Questions by Cognitive Level				
Reporting Category	**Knowledge**	**Comprehension**	**Application**	**Higher Mental Activities**	**Examination Emphasis (%)**
Polynomial Functions	7	3, 5	1, 2, 4, (1)	6	12
Trigonometric and Circular Functions	8	9 10, 11	13, 14, (2), [2]	12	19
Statistics	19	15, 16, 20	17, 18, 21, [4]	(3)	19
Quadratic Relations	24	22, 25, 28	23, 26, (4)	27	12
Exponential and Logarithmic Functions	29	30	32, 33, 34, (5)	31, 35	12
Permutations and Combinations		37	36, [1]	(6)	12
Sequences and Series		38, 40	39, (7), [3]		14
Examination Emphasis (%)	7	22	60	11	100%

This examination has a balance of question types and difficulties. It is designed so that students capable of achieving the acceptable standard will obtain a mark of 50% or higher and students capable of achieving the standard of excellence will obtain a mark of 80% or higher.

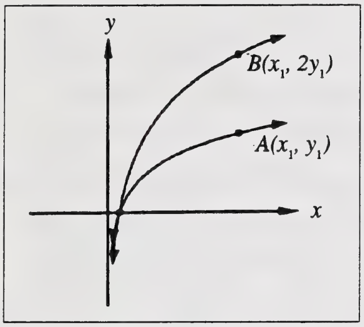
Multiple Choice

For a complete breakdown of student responses by alternative for the multiple-choice questions, please refer to the school and jurisdiction reports.

Students were expected to achieve the acceptable standard on all knowledge and comprehension questions—those questions that required students to apply one concept. Almost all students met this expectation. Students achieving the standard of excellence were expected to demonstrate a thorough knowledge of mathematics and to apply this knowledge to new situations. Questions 6, 12, 27, 31, and 35 required students to apply their knowledge of mathematics to a new situation. An illustrative question follows.

Question	Key	Difficulty*	Question	Key	Difficulty*
1	A	70.5	21	B	81.4
2	B	80.0	22	C	76.4
3	D	66.0	23	C	82.9
4	B	60.4	24	B	71.2
5	D	67.2	25	D	62.5
6	B	56.4	26	C	34.2
7	B	19.5	27	C	36.9
8	B	75.5	28	A	78.0
9	D	80.2	29	D	84.3
10	C	69.1	30	B	77.6
11	C	57.2	31	C	74.5
12	B	41.8	32	D	66.7
13	D	50.6	33	A	84.7
14	A	42.7	34	A	65.6
15	D	73.1	35	C	29.6
16	C	68.2	36	C	79.3
17	A	74.4	37	A	66.3
18	D	58.1	38	A	90.5
19	A	60.0	39	A	77.1
20	B	84.7	40	C	66.0

*Difficulty—percentage of students answering the question correctly



35. In the diagram, A is on the graph of $y = \log_7(x)$ and B is on the graph of

A. $y = \log_7(2x)$
B. $y = \log_7(x^{1/2})$
• C. $y = \log_7(x^2)$
D. $y = (\log_7 x)^2$

Question 35 required students to use the graph of a logarithmic function along with their understanding of logarithmic laws and properties to predict the equation of the curve that contains point B. Students who achieve the acceptable standard are expected to apply their knowledge of laws and properties of logarithms to evaluate logarithmic expressions and to use the graphs of logarithmic functions to estimate the value of one of the variables, given the other variable. Students who achieve the standard of excellence are expected to be able to draw these two ideas together in order to solve the problem. In fact, only 42.5% of the students who achieved the standard of excellence were able to apply their knowledge of graphs and logarithms by identifying the correct response. Students who achieved the acceptable standard were not able to use the logarithmic laws and incorrectly selected alternative A or B.

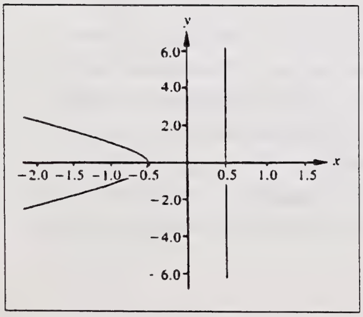
Numerical Response

Question	Key	Difficulty*
1	12	70.5
2	2.3	73.3
3	74	49.3
4	1.5	38.9
5	2.1	53.7
6	80.0	19.7
7	18.0	41.7

*Difficulty—percentage of students answering the question correctly

4. The eccentricity is the ratio of the distance between a point on the graph and the fixed point to the distance between the same point and the fixed line. Shown below is the partial graph of a hyperbola with a point on the graph at $(-\frac{1}{2}, 0)$, a fixed point (focus) at (-2, 0) and a fixed line (directrix) at $x = \frac{1}{2}$.

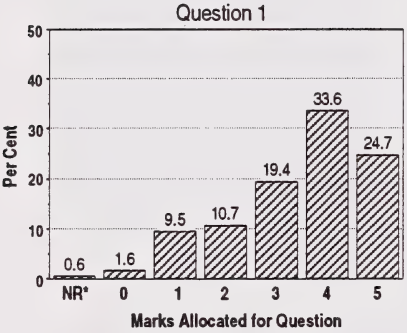
Correct to the nearest tenth, the eccentricity of this conic is ____________.



Question 4 required students to calculate the eccentricity of conic, given its fixed line (directrix), its fixed point (focus), and a point on the conic. The definition of eccentricity was provided. It was expected that all students who met the acceptable standard should be able to describe a conic and calculate its eccentricity, given this information. Only 35.3% of the students who met the acceptable standard and 71.8% of the students who met the standard of excellence were able to read the information presented and calculate the eccentricity that described this conic. Most students who met the acceptable standard apparently assumed from the diagram that the informatin was about a parabola and so stated that the eccentricity was “1”. This is an example of the importance of reading and identifying the information required to solve a problem.

Written Response

Questions in the written-response section dealt with four of the seven content strands for Mathematics 30. Students performing at the acceptable standard were expected to obtain at least half marks on all questions. Students performing at the standard of excellence were expected to answer all questions almost perfectly. We were very pleased with the number of students who attempted all the written-response questions. Once students attempted the questions, they were able to receive some marks. Only 2.3% of all students received no marks for question 1, only 11.3% received no marks for question 2, only 11.1% received no marks for question 3 and only 7.7% received no marks for question 4. This was a considerable improvement over previous years, when as many as 47.2% of students failed to receive any marks for a question.



*NR—No Response

Question 1 required students to determine the number of linear permutations and the number of circular permutations in a given situation. They then had to explain why there were more linear permutations than circular permutations. Overall, students did very well on this question. Those who met the acceptable standard were expected to determine the number of permutations and then begin an explanation in part c. Of the students who met the acceptable standard on the examination, 61% met the expectation for this question. Those students who met the standard of excellence were expected to be able to determine the number of permutations and to provide a complete explanation in part c. Of the students who met the standard of excellence, 55.4% met the expectation for this question. On this 5-mark question, the average mark was 3.47 or 69.4% of the available mark.

The Scoring of Question 1: parts a and b were worth 4 checkmarks for a total of 3 marks.

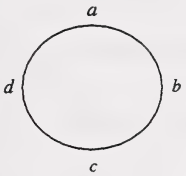
Checkmarks	**Marks**
4	3
3	2
1 or 2	1

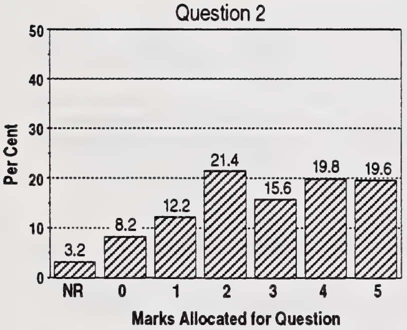
Note: If students correctly determined the number of linear permutations and the number of circular permutations, they received 4 checkmarks. If students correctly determined one of the permutations and started a strategy that would lead them to a reasonable solution for the second permutation, they received 3 checkmarks. If they started a strategy for one permutation, they received one checkmark. If they started a strategy for both permutations or correctly identified only one permutation, they received 2 checkmarks.

Part c was worth 2 marks. The question explicitly asks students to explain why there are more ways for the the 4 cheerleaders to arrange themselves in a row than in a circle. A number of students stated that circles have no endpoints, but this statement does not indicate why.

One example of an explanation that would receive 2 marks is:

> Four arrangements in a row are related to the same circular arrangement. There is no starting or ending point in a circular arrangement. For example, the four linear permutations
>
> *a b c d*
> *b c d a*
> *c d a b*
> *d a b c*
>
> all relate to the same circular permutation:





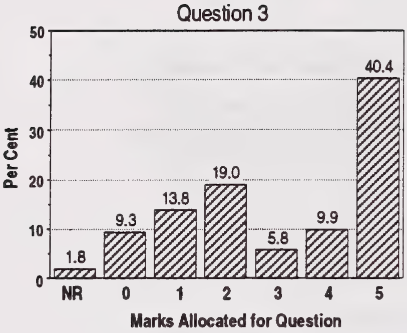
Question 2 required students to comment on the reasonableness of results. This question could have simply asked students to identify the range, amplitude, and period for this trignometric function. However, the question was asked in the way it was to incorporate aspects of problem solving. Students were required to analyse each of the answers provided, to agree or disagree with them, and to indicate why. They were expected to use the graph in their analysis. Students who met the standard of excellence were expected to obtain at least 4 out of 5 marks on this question. In fact, 84.7% of these students met this expectation. Students who met the acceptable standard were expected to achieve at least 3 out of 5 marks; 57.9% met this expectation. Overall, 60.5% of students who wrote the examination met the acceptable standard for this question. On this 5-mark question, the average mark was 2.79 or 55.8% of the available mark.

The Scoring of Question 2: in order to receive 3 checkmarks, students needed to state, either explicitly or implicitly, whether they agreed or disagreed with each of Grace's answers. The additional checkmarks were earned by stating a correct reason.

Checkmarks	Marks
5 or 6	5
4	4
3	3
2	2
1	1

One example of a response that would receive a mark of 5 is:

> I disagree with the range because the range should be $-1 \leq y \leq 3$. The amplitude is 2 not 4. I agree with the period because the graph begins to repeat itself every $\frac{2\pi}{3}$ radians.



Question 3, part a, required students to identify the type of sequence and write an expression to describe its “nth” term. In part b, students were expected to determine a different sequence with the same first and third terms as the sequence in part a. There were an infinite number of solutions for part b. Students who met the acceptable standard were expected to be able to successfully complete part a and to begin a strategy to the solution in part b. Students exceeded these expectations; 40.4% of the students who met the acceptable standard not only successfully completed part a but successfully completed part b as well. Students who met the standard of excellence were expected to be able to successfuly complete parts a and b; 85.8% of these students met that expectation. On this 5-mark question, the average mark was 3.11 or 62.2% of the available mark.

The Scoring of Question 3: part a was worth 2 marks, detemined as follows:

2 marks	The student’s response indicates, either explicitly or implicitly, that the sequence is geometric and the *n*th term formula is correct when $a = 6$ and $r = 2$ are both substituted into the formula.
1 mark	The student indicates, either explicitly or implicitly, that the sequence is geometric ***or*** the student provides a *n*th term formula and the formula describes the sequence when $a = 6$ is substituted into the formula.

One example of a response that would receive 2 marks is:

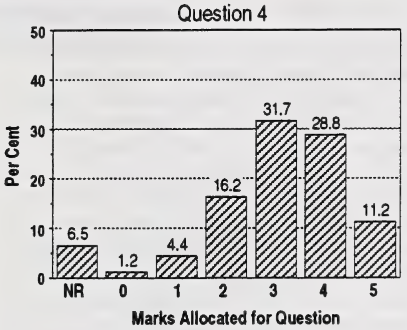
> The sequence is geometric with $r = 2$. Then, $t_n = 6(2)^{n-1}$.

Part b was worth 3 marks, determined as follows:

3 marks	The student’s expression for t_n gives a first term of 6 and a third term of 24 when $n = 1$ and $n = 3$ are substituted into the expression. The second term of the sequence is shown and can be obtained from t_n when $n = 2$.
2 marks	The student’s expression for t_n gives a first term of 6 and a third term of 24 when $n = 1$ and $n = 3$ are substituted into the expression.
1 mark	The student’s expression for t_n gives a first term of 6 or a third term of 24 when $n = 1$ and $n = 3$ are substituted into the expression ***or*** student begins a strategy for determining an expression for t_n.

One example of a response that would receive 3 marks is:

> The sequence could be arithmetic, geometric, or neither.
> If $t_1 = 6$, 2 = 14, and $t_3 = 24$, then $t_n = (n + 2)^2 + (n - 4)$.



Question 4 required students to develop a strategy toward the solution of a problem. The problem was that the Ice Haven Company wanted to introduce a new frozen dessert. They wanted to do a survey to determine which new frozen dessert would be most popular. Students were asked to provide the Ice Haven Company with a proposal for the survey. Students needed to identify a population, then describe how a sample of the chosen population should be selected and how the survey should be conducted. Students did well on this question. It was expected that students' statements would describe the population, the sampling process, and how the data would be collected. Responses were expected to demonstrate that the students had a sense of reliability, bias, or validity. Students who met the acceptable standard were expected to score at least 3 out of 5 on this question; only 63.3% did so. Students who met the standard of excellence were expected to score at least 4 out of 5 on this question, and 72.2% did so. On this 5-mark question, the average mark was 3.03 or 60.6% of the available mark.

The Scoring of Question 4: a checkmark scale was used to score this question:

Checkmarks	**Marks**
9 or 10	5
7 or 8	4
5 or 6	3
3 or 4	2
1 or 2	1

Students received either 1 or 2 checkmarks according to the following criteria:

Population	1 2	The student's response includes the term "population" or implies something larger than the sample. The student's description of the population includes limiting terms; for example, the population is all people who live in Alberta or Canada, or all students in grades 10, 11, and 12.
Sample	1 2	The student's response indicates, either explicitly or implicitly, that the sample is smaller than the size of the population. The student's description of the sample is consistent with and represents the description of the population.
Method of Selection	1 2	The student's response describes the type of sampling procedure that will be used; for example, random, convenience, stratified. The student's response explains the process of selection to match the sampling procedure.
Data Collection	1 2	The student's response indicates a type of data collection process; for example, an interview, a questionnaire, ***or*** a taste test. The student's response describes how or where the data will be collected or what questions will be asked.
Consistency	1 2	The student's response illustrates a concern for fairness, reliability, validity, bias, or accuracy. The student's response is workable; that is, the survey as designed could be carried out.

One example of a response that would score a 5 is:

> Since not all people like frozen dessert, it is useless to select people randomly on the street and ask what type of dessert he/she likes. The general population probably does not pay attention to the types of dessert available from the Ice Haven Company. Therefore, it is better to choose a sample from people who go to the Ice Haven Company because they like the Company's desserts. Three surveyors would be sent to each company to conduct the survey. Each surveyor will stand beside the cashier and ask every tenth customer that goes to the cashier to order food, "Have you answered the Ice Haven's survey yet?" If the answer is "yes", then wait for the next 'tenth' person. If the answer is "no" then ask the question "What new type of frozen dessert would you like to see on the menu?" When the customer has answered the question, the surveyor will tally the results. The survey will last for a 3 month period in order to get most of the population who buy frozen desserts from the Ice Haven Company. I chose a population that likes desserts. The way that the survey will be conducted prevents biased and inaccurate results because people are chosen randomly and approximately one tenth of the population will be surveyed. The results from the survey should represent the views of the population.

One example of a response that would score a 3 is:

> The population will include anybody because most people like dessert and would have a favorite kind. This survey should not be conducted in the winter because people are not interested in frozen desserts when it is cold. The survey could be taken inside a mall where all age groups are represented. The survey should be conducted on the weekend because you will get those people who are not at work or in school. The middle of the afternoon would be the best time since those people who have slept-in may be at the mall.

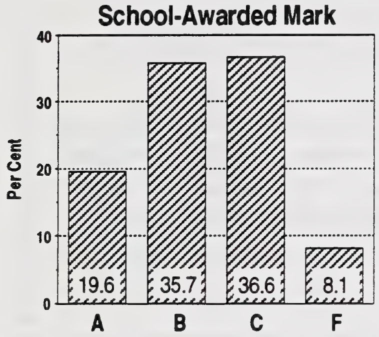
One example of a response that would score a 1 is:

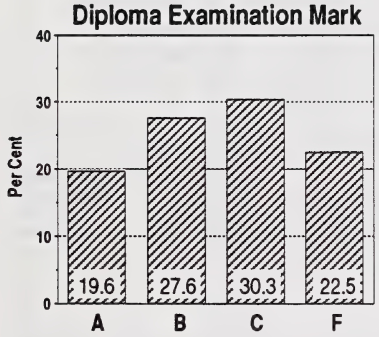
> My proposal is to find some restaurants in different districts in a city. Then I would design a survey sheet to ask the people which type of dessert they like.

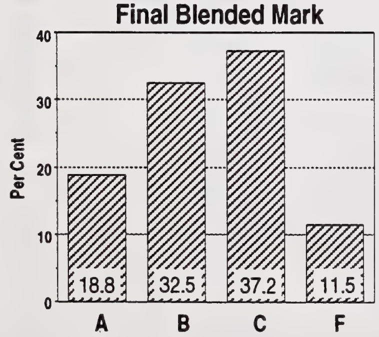
For further information, contact Florence Glanfield, Lowell Hackman, or Phill Campbell at the Student Evaluation Branch, 427–0010.

Biology 30

Diploma Examination Results
Examiners' Report for January 1992


School-Awarded Mark


Diploma Examination Mark


Final Blended Mark

The summary information in this report provides teachers, school administrators, students, and the general public with an overview of results from the January 1992 administration of the Biology 30 Diploma Examination. This information is most helpful when used in conjunction with the detailed school and jurisdiction reports that have been mailed to schools and school jurisdiction offices. An annual provincial report containing a detailed analysis of the combined January, June, and August results will be available next fall.

Description of the Examination

The Biology 30 Diploma Examination consists of two parts: a multiple-choice section of 70 questions worth 70% and a written-response section of five questions worth 30% of the total examination mark. Question 19 in the multiple-choice section was deleted, thus reducing the multiple-choice portion of the examination to 69 questions worth 70%.

Achievement of Standards

The information reported is based on the final blended marks achieved by 9 228 students who wrote the January 1992 examination. This represents an increase of about 600 students compared with the number who wrote the January 1991 Diploma Examination.

- 88.5% of these students achieved the acceptable standard (a final blended mark of 50% or higher).
- 18.8% of these students achieved the standard of excellence (a final blended mark of 80% or higher).

Generally, student achievement in Biology 30 for the first semester of 1991–92 was similar to that for the first semester of 1990–91. There was, however, a small increase (from 86.9 to 88.5) in the percentage of students who achieved the acceptable standard. Most students demonstrated a good understanding of the nature of scientific inquiry as it relates to the study of human physiology.

Provincial Averages

- The average school-awarded mark was 66.7%.
- The average diploma examination mark was 63.1%.
- The average final blended mark, representing an equal weighting of the school-awarded mark and the diploma examination mark, was 65.3%.

Results and Examiners' Comments

The examination has a balance of question types and difficulties. It is designed so that students capable of achieving the acceptable standard would obtain a mark of 50% or higher and students capable of achieving the standard of excellence would obtain a mark of 80% or higher. This examination differs in structure from the 1991 Biology 30 examinations in that it contains five written-response questions, not seven, for a total of 30 marks. The maximum value of any one written-response question is 10 marks compared with the maximum value of 6 marks on previous Biology 30 examinations. The change in structure did not have a significant effect on general students performance.

Approximately 14.7% of the students who wrote the Biology 30 Diploma Examination in January 1992 and received a blended mark had written at least one other Biology 30 Diploma Examination during the August 1990 to August 1991 period. This subpopulation (1 355) achieved an examination average of 60.4% compared to 63.6% for the population (7 873) whose first writing of a Biology 30 examination was in January 1992. By rewriting, however, this group of students (1 355) increased their examination average score from 48.2% to 60.4%.

Subtest

When analysing detailed examination results, please bear in mind that subtest results **cannot** be directly compared.

Results are in average raw scores.

Machine scored: 46.8 out of 69

Written response: 15.4 out of 30

- **Course Content**
  - Cellular Processes: 6.1 out of 9
  - Homeostatic Mechanisms: 3.0 out of 4
  - Nutrition and Digestion: 6.9 out of 16
  - Body Fluids: 9.8 out of 14
  - Breathing, Gas Exchange, and Transport: 4.7 out of 7
  - Energy Release: 3.4 out of 5
  - The Kidney: 6.0 out of 10
  - Regulation of the Internal Environment: 13.1 out of 20
  - Voluntary Movement and Body Support: 2.8 out of 4
  - Human Reproduction: 6.5 out of 10
- **Process Skills:** 14.7 out of 26
  - Multiple-choice questions 4, 5, 6, 9, 12, 13, 32, 38, 46, and 69; and written-response questions 1 and 2
- **Cognitive Levels**
  - Knowledge: 17.8 out of 25
  - Comprehension and Application: 29.6 out of 49
  - Higher Mental Activities: 14.8 out of 25

Examination Blueprint

Each question on the examination is classified in two ways: according to the curricular content area being tested and according to the cognitive level demanded by the question. The examination blueprint illustrates the distribution of questions in January 1992 according to these classifications. Numbers with brackets [ ] indicate written-response questions and those without brackets indicate multiple-choice questions.

	Questions by Cognitive Level			
Reporting Category	**Knowledge**	**Comprehension and Application**	**Higher Mental Activities**	**Examination Emphasis (%)**
Cellular Processes	1, 2	3, 4, 5, 6, 7, 8	9	9
Homeostatic Mechanisms	11	10	12, 13	4
Nutrition and Digestion	14, 15, 16, 17	[2]	[3]	16
Body Fluids	18, 25, 29, 30	19*, 20, 21, 22, 23, 26, 27, 28, 31, 32	24	15
Breathing, Gas Exchange, and Transport	33, 34	36, 37, 38, 39	35	7
Energy Release	40	41, 42, 43, 44		5
The Kidney	47, 48	45, 46 [4]	49, 50	10
Regulation of the Internal Environment	52, 53, 55 56, 59, 60	51, 54, 57, 58 [1]**	[1]	20
Voluntary Movement and Body Support	64	61, 62, 63		4
Human Reproduction	66, 68	65, 67 [5]	69, 70	10
Examination Emphasis (%)	25	55	20	100

* Multiple-choice question 19 was deleted.

** Written-response question 1 is reported in the subtest under Higher Mental Activities.

Multiple Choice

Question	Key	Difficulty*
1	C	77.1
2	A	81.3
3	D	72.5
4	A	54.2
5	D	70.6
6	B	51.6
7	B	69.7
8	C	88.1
9	A	44.0
10	C	79.6
11	D	82.0
12	A	70.1
13	D	63.0
14	D	75.7
15	B	85.1
16	A	51.0
17	C	49.9
18	A	72.6
19	deleted	
20	B	72.0
21	A	87.1
22	D	62.8
23	D	53.8
24	C	60.6
25	A	84.0
26	C	82.4
27	D	72.6
28	B	66.3
29	B	74.2
30	D	71.2
31	B	50.7
32	A	67.8
33	A	83.3
34	B	81.9
35	C	80.4
36	B	43.3
37	C	64.0
38	D	69.1
39	C	52.1
40	A	83.5
41	D	64.1
42	B	63.3
43	C	57.5
44	A	69.5
45	D	78.4
46	D	69.2
47	B	71.8
48	B	53.6
49	A	70.7
50	C	72.0
51	C	54.8
52	B	87.4
53	A	69.4
54	C	56.8
55	B	71.4
56	C	72.0
57	B	65.3
58	D	64.5
59	B	62.8
60	D	53.1
61	D	63.5
62	A	84.8
63	A	71.2
64	C	60.2
65	B	62.5
66	C	63.9
67	D	68.1
68	D	60.0
69	C	74.4
70	A	42.4

*Difficulty—percentage of students answering the question correctly

Multiple Choice

For a complete breakdown of student responses by alternative for the multiple-choice questions, please refer to the school and jurisdiction reports.

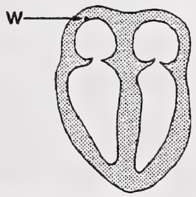
Most students who achieved the acceptable standard demonstrated an understanding of biological concepts by tracing the pathways of fluids through the human body (questions 18, 20, 30, and 45) and by identifying physiological cause-and-effect sequences (questions 37 and 58). These students also related human physiology to common everyday experiences (questions 26, 28, 44, and 52). They translated symbolic representations of biological functions into word descriptions or explanations (questions 8 and 35). They interpreted data presented in graphs (questions 12, 38, 46, and 69). When given descriptions of simple laboratory investigations, they made correct predictions (questions 4 and 5), and they evaluated experimental designs (questions 13 and 32).

Students who achieved the standard of excellence, in addition to fulfilling the expectations identified above, demonstrated the ability to integrate concepts of biology and chemistry in the context of human physiology (questions 16, 17, 36, 43, and 48). They interpreted complex sets of data (questions 6 and 9), and solved multistep problems (questions 23 and 31). They analysed complex regulatory mechanisms (questions 51, 54, and 70). They responded correctly to questions that required detailed knowledge of human tissues and organs (questions 39, 59, and 60).

Detailed comments on four questions follow.

Use the following diagram to answer question 19.

A Longitudinal Section of the Human Heart



19. The heart rate will accelerate if the regulatory structure located a W is stimulated by neurotransmitters released from

- ● **A.** sympathetic neurons originating in the spinal cord
- **B.** sympathetic neurons originating in the hypothalamus
- **C.** parasympathetic neurons originating in the cerebrum
- **D.** parasympathetic neurons originating in the medulla oblongata

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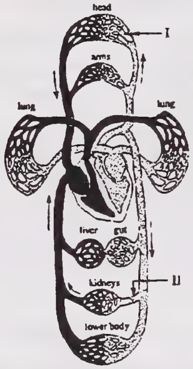
Question 19 was deleted from the examination because it contained two possible answers. The use of the word *neurons* instead of *nerves* in alternatives A and B made alternative B a correct answer in addition to alternative A, which was the keyed response.

Use the following diagram to answer questions 21 and 22.

A Schematic Representation of the Human Circulatory System



22. A partial blockage in the blood vessel labelled II could result in

- **A.** sugar levels in the urine being higher than normal
- **B.** reduced use of absorbed nutrients by all body cells
- **C.** protein levels in the urine being higher than normal
- ● **D.** a higher concentration of nitrogenous compounds in the blood

Question 22 required students to understand the basic composition of human blood and how this composition may be affected by the organ systems through which the blood flows. They then had to link the reduction of blood flow, as indicated by vessel blockage, with the role of the kidneys and possible subsequent changes in blood or urine composition. The meanings of *concentration* and *nitrogenous* were integral to identifying the correct response. This concept-integrated question was answered correctly by 90.8% of the students who achieved the standard of excellence (A) on the examination. Of the students who failed to achieve the acceptable standard, 34.0% selected the correct response and 46.5% selected either distractor A or distractor C. Many students did not understand that a reduction in blood volume, and therefore in blood pressure, would cause a decrease in the amount of urine as well as an increase in the amount of solutes in the urine. Furthermore, these students did not understand that normal urine lacks sugar and large proteins. Of the students who obtained a B or C level of achievement, 64.4% selected the correct answer.

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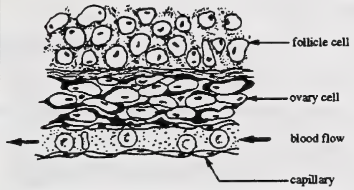
47. Two hormones that regulate blood levels of H_20, Na^+, and K^+ by acting on kidney tubules are

- **A.** ADH and adrenaline
- ● **B.** ADH and aldosterone
- **C.** adrenaline and thyroxine
- **D.** thyroxine and aldosterone

Question 47 required students to recall the names of two hormones that regulate reabsorption in the kidney. The question was worded so that the emphasis lay on the concentration of blood components rather than on urine composition. This question was answered correctly by 71.8% of the students. Students selected distractors A, C, and D, adrenaline and/or thyroxine, almost equally. Of the students who achieved the standard of excellence on the examination, 96.8% chose the correct answer. Of the students who failed the examination, only 40.4% chose the correct answer. With sufficient review, most students who enrol in Biology 30 can remember the names of the main hormones that are identified in the core curriculum and can associate these hormones with the organ functions that they regulate.

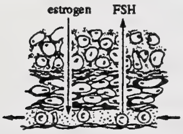
Use the following diagram to answer question 70.

A Capillary in Tissues of a Human Female

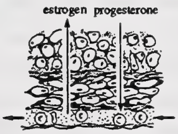


70. Which diagram represents the net movement of hormones to and from a capillary in an ovary?

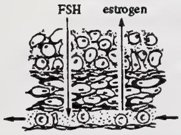
● A.



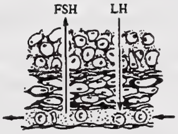
B.



C.



D.

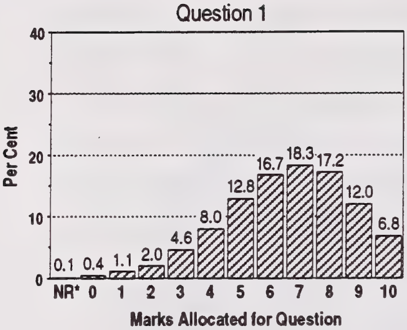


Question 70 also required students to identify a correct pair of hormones but in a more challenging context. After selecting the correct pair of hormones, students had to decide which member of the pair stimulated the ovary to produce the other hormone. Students then had to determine the proper sequence of stimulus and response by analysing the direction of the hormone arrows in relation to the direction of blood flow through the ovary. Only 42.4% of the total population selected the correct response. Of the students who achieved the standard of excellence on the examination, 80.0% chose the correct response. Of the students who achieved the acceptable standard (those receiving a letter grade B or C on the examination), 39.0% selected the correct response. An additional 21.0% of this group selected the correct pair of hormones but in the wrong relationship (alternative C). The remaining 40% of this group chose incorrect pairs of hormones (alternatives B and D). Of the students who obtained an F on the examination, only 18.5% analysed the diagrams correctly and selected the correct pair of hormones. This question very clearly identified the various levels of student achievement.

Written Response

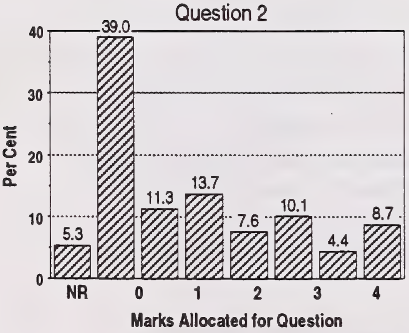
The five questions in the written-response section are designed to assess achievement on 6 of the 10 content strands for Biology 30. In addition, question 1 required students to analyse and evaluate experimental designs and scientific data. To answer this question, students were expected to draw on their understanding of process skills. All five questions required students to go beyond the recall of information and to apply their understanding of biological concepts to problems in human physiology. The questions required students to analyse contextual material before composing responses. Question 3 in particular required students to integrate several concepts and to compose a response that clearly linked the structural and functional characteristics of specialized body parts.

Responses to the written-response section indicated that most students approached the examination with serious intent and expended commendable effort. Some students achieved full marks on each of the five questions. However, approximately 47.5% of the students obtained less than 15 marks out of 30 on the written-response section of the examination. Many students did not present clear and specific answers, but rather communicated in vague generalities, leaving too much interpretation up to the examiner.

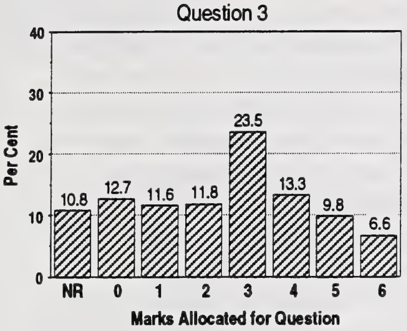


*NR—No response

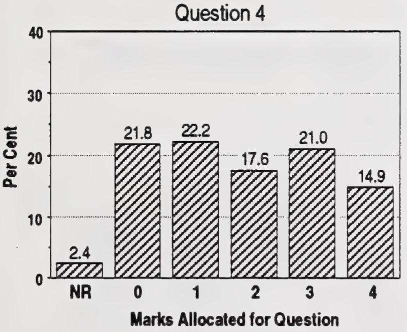
Question 1: Most students demonstrated a good understanding of the nature of scientific investigation. They were able to analyse and evaluate experimental designs with a fair degree of sophistication. The students (6.8%) who achieved full marks on this question composed clear and concise answers. They showed an excellent understanding of scientific investigative processes. Most students recognized the problem (part a) that was investigated, but some did not express it in a way that clearly identified the two variables involved. Part b was well answered by most students. Surprisingly, many students had difficulty with part c. Either they did not identify a specific structure or their explanation of the effect of caffeine on the endurance of a specific body structure was imprecise or missing. In part d, most students were able to identify difficulties in the two experimental designs, but many failed to explain how these difficulties could cause problems in obtaining valid results. Most students understood that the experimental subject's knowledge of the treatment can affect the results (part e). The most common problem in part f was the failure of students to formuate and then support a conclusion using both studies. Sometimes it was difficult for the examiner to determine if a student was just careless or did not understand the importance of considering all the data, even if they were inconsistent. Only 16.2% of the population failed to achieve the acceptable standard on this data-based research question, and 36% achieved the standard of excellence. On this 10-mark question, the average mark was 6.57 or 66% of the available mark.



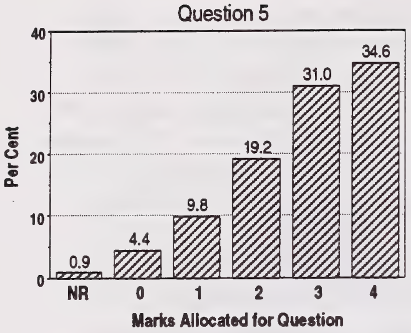
Question 2: Students were required to link their understanding of enzyme, function, acids and bases (pH), chemical digestion of protein, and hormone regulation. The expectations embodied in this question are firmly anchored in the Biology 30 *Course of Studies* as well as in diploma evaluation tradition. It is therefore surprising that 69.3% of the students did not achieve the acceptable standard on this question. Many students made correct predictions but then failed to support them with adequate explanations. Very few students made a distinction beween pepsinogen and pepsin. The concept of active versus inactive enzymes was not clearly linked to variations in pH. Inappropriate terminology was used (dissolving or frying instead of digestion). In part b, the names of enzymes, acids, or bases were used in the place of hormones. Many students did not match the region with the proper hormone and/or function. The students who achieved the standard of excellence on the examination obtained an average of 74% on this question in contrast to an average of 4% for those who failed the examination. On this 6-mark question, the average mark was 1.76 or 29% of the available mark.



Question 3: Approximately 16% of the students gave excellent answers to this partially open-ended question, but almost 24% obtained no marks at all. Many students identified appropriate structures but then presented vague supportive explanations. In particular, the links between the nervous system and the digestive system were weak. Many students said that the nervous system has the ability to control the amounts and/or types of nutrients that are absorbed by the small intestine. Students confused *enzymes* with *hormones* and *absorb* with *reabsorb*. Some students described the interrelationships between the circulatory and digestive systems in general and did not take into account the limits set by the context of the question. Many students demonstrated poor organizational skills. These students could have benefited from preparing a rough draft on the tear-out pages provided. On this 6-mark question, the average mark was 2.47 or 41% of the available mark.



Question 4: Most students accounted for the absence of glucose by stating that it was reabsorbed. Some students expanded on their initial idea but in so doing introduced elements of error, e.g., glucose is reabsorbed in the loop of Henle. In part b, most students identified a substance found in the fluid of Q but not in the fluid of R. Many did not obtain a second mark for part b because they did not present a satisfactory explanation. The concept of separation by size was often omitted. The answers to part c tended to be very general and did not identify the specific effect of ADH on the target site (membrane of the distal tubule.) Many students focused on the process of reabsorption of water rather than on the change in permeability of the membrane. From the responses, it appears that the concept of target site was not adequately understood.
A number of students did state that ADH affects the permeability of structure T but then failed to say whether ADH increased or decreased the permeability of structure T to water. Fifty-six per cent of the students who obtained a letter grade of B or C on the examination obtained 2 marks or more on this question, compared with 11% of the group who failed the examination. On this 4-mark question, the average mark was 1.80 or 45% of the available mark.

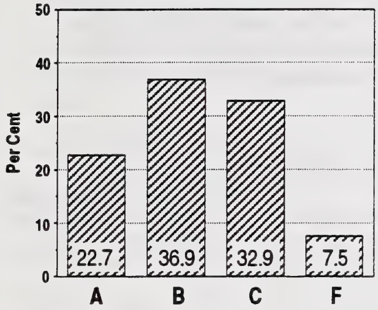


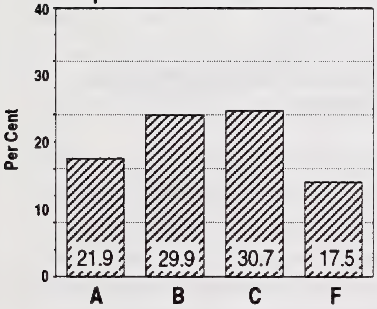
Question 5: Most students understood the general function of each of the structures affected by a special condition. Therefore, it was not difficult for them to identify how each condition could prevent fertilization. Students lost marks because they neglected to finish their explanations, used specialized vocabulary incorrectly (semen instead of sperm), or interchanged male with female structures (seminiferous tubules with fallopian tubes). Of the students who achieved the standard of excellence on the examination, 67.5% explained correctly how all four of the conditions could cause sterility. Of the students who failed the examination, 7.8% explained all four conditions correctly. On this 4-mark question, the average mark was 2.80 or 70% of the available mark.

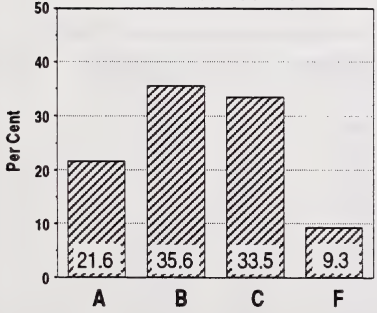
For further information, contact Lowell Hackman or
Phill Campbell at the Student Evaluation Branch, 427–0010.

Chemistry 30

Diploma Examination Results
Examiners' Report for January 1992


School-Awarded Mark


Diploma Examination Mark


Final Blended Mark

The summary information in this report provides teachers, school administrators, students, and the general public with an overview of results from the January 1992 administration of the Chemistry 30 Diploma Examination. The information is most helpful when used in conjunction with the detailed school and jurisdiction reports that have been mailed to schools and school jurisdiction offices. An annual provincial report containing a detailed analysis of the combined January, June, and August results will be available next fall.

Description of the Examination

The Chemistry 30 Diploma Examination consists of three parts: a multiple-choice section of 42 questions worth 60%, a numerical-response section of seven questions worth 10%, and a written-response section of three questions worth 30% of the total examination mark.

Achievement of Standards

The information reported is based on the final blended marks achieved by 7 462 students who wrote the January 1992 examination.

- 90.7% of these students achieved the acceptable standard (a final blended mark of 50% or higher).
- 21.6% of these students achieved the standard of excellence (a final blended mark of 80% or higher).

Overall, student achievement in Chemistry 30 was acceptable, particularly in knowledge of core concepts. However, students continued to have difficulty with laboratory-related skills and processes, and in organizing and communicating their chemistry knowledge.

Provincial Averages

- The average school-awarded mark was 66.9%.
- The average diploma examination mark was 65.1%.
- The average final blended mark, representing an equal weighting of the school-awarded and the diploma examination marks, was 67.0%.

Results and Examiners' Comments

Subtest

When analysing any detailed examination results, please bear in mind that subtest results **cannot** be directly compared.

Results are in average raw scores.

Machine scored: 35.55 out of 49

Written response: 12.1 out of 21

- **Course Content**
  - -Chemical Energetics: 13.7 out of 23
  - -Acids and Bases: 15.73 out of 24
  - -Oxidation-Reduction: 16.13 out of 23
- **Process Skills:** 27.01 out of 45
  - -Multiple-choice questions 3, 5, 7, 9, 10, 12, 15, 16, 17, 22, 23, 26, 27, 28, 33, 34, 35, 36, 38; numerical-response questions 3, 4, 5, 6, and 7; and written-response questions 1, 2, and 3.
- **Cognitive Levels**
  - -Knowledge: 14.96 out of 19
  - -Comprehension and Application: 25.17 out of 39
  - -Higher Mental Activities: 5.44 out of 12

Examination Blueprint

Each question on the examination is classified in two ways: according to the curricular content area being tested and according to the cognitive level demanded by the question. The examination blueprint illustrates the distribution of questions in January 1992 according to these classifications. Numbers with brackets [ ] indicate written-response questions, those with parentheses ( ) indicate numerical-response questions, and those without brackets or parentheses are multiple-choice questions.

	Questions by Cognitive Level			
Reporting Category	**Knowledge**	**Comprehension and Application**	**Higher Mental Activities**	**Examination Emphasis (%)**
Chemical Energetics	1, 4, 6, 11, 13, 14, (1)	2, 5, 8, 10, 12, (2), [1]	3, 7, 9, [1]	33
Acids and Bases	15, 16, 17, 18, 27, [2]	19, 20, 21, 22, 23, 24, 26, 28, (3) [2]	25, (4) [2]	34
Oxidation-Reduction	29, 30, 32, 34, 37, 38, 42	31, 33, 35, 36, 39, 40, 41, (5) (6) (7) [3]		33
Examination Emphasis (%)	29	52	19	100%

Note: For reporting purposes, the three cognitive levels of the written-response section have been combined into one component.

This examination has a balance of question types and difficulties. It is designed so that students capable of achieving the acceptable standard would obtain a mark of 50% or higher and students capable of achieving the standard of excellence will obtain a mark of 80% or higher. Future examinations will continue to require students to demonstrate clarity in their thinking and understanding of concepts by applying their knowledge to new and novel situations. Students who achieved these expectations were successful on this examination. The next series of diploma examinations will continue to require students to communicate their answers in a clear and concise fashion as well.

Multiple Choice

Question	**Key**	**Difficulty***	**Question**	**Key**	**Difficulty***	**Question**	**Key**	**Difficulty***
1	A	91.2	15	A	95.5	29	C	74.2
2	C	89.0	16	A	64.7	30	C	80.3
3	B	42.8	17	C	81.7	31	A	50.3
4	C	62.7	18	B	79.2	32	A	79.1
5	A	74.4	19	B	63.5	33	B	83.7
6	B	89.1	20	D	76.8	34	C	71.9
7	A	61.8	21	C	84.5	35	D	66.6
8	C	79.6	22	B	35.2	36	A	59.3
9	B	66.5	23	C	89.9	37	B	92.1
10	D	27.8	24	D	70.5	38	D	70.7
11	B	92.0	25	A	43.6	39	D	77.6
12	D	71.2	26	A	63.3	40	C	75.5
13	C	80.7	27	B	95.2	41	A	81.2
14	D	68.5	28	D	41.9	42	B	77.3

*Difficulty—percentage of students answering the question correctly

For a complete breakdown of student responses by alternative for the multiple-choice questions, please refer to the school and jurisdiction reports.

The following questions were selected for discussion because they exemplify what is required to meet the acceptable standard and the standard of excellence.

10. 25.0 g of ice at the melting point are added to calorimeter water at 25.4°C. When thermal equilibrium is reached, the final temperature of the mixture is 15.0°C. The original volume of water in the calorimeter was

A. 93.4 mL
B. 136 mL
C. 209 mL
● D. 228 mL

Question 10: Most students recognized that a change in both kinetic energy and potential energy is involved and, as a result, they could construct/recall the proper algorithm to solve the question. However, all students who did not attain the standard of excellence had difficulty assigning correct values to the algorithm. One problem these students had was recognizing what occurs when a thermal equilibrium is reached. This lack of understanding resulted in 19.1% of the students selecting 15.0°C as the value for Δt for “ice water” and 25.4°C as the Δt for “calorimeter water”. A total of 29.8% of the students did not recognize that when ice melts to liquid water, the specific heat capacity is that of liquid water and not that of solid ice. This result suggests that those students who do not attain the standard of excellence cannot transfer what they see happening in a laboratory context into an algorithm and then solve it correctly.

21. An apple was analysed and found to have a pH of 3.30. The $[OH^-_{(aq)}]$ for this sample is

A. 1.0×10^{-3} mol/L
B. 5.0×10^{-4} mol/L
● C. 2.0×10^{-11} mol/L
D. 1.0×10^{-10} mol/L

Question 21: Most students (84.5%) recognized the relationship between $[H_3O^+_{(aq)}]$ and $[OH^-_{(aq)}]$ and calculated the correct value. Of the students who answered incorrectly, the most common mistake (13.5%) was the failure to recognize this relationship. This result suggests that students attaining the acceptable standard understand fundamental concepts and are able to solve simple two-step problems involving these concepts.

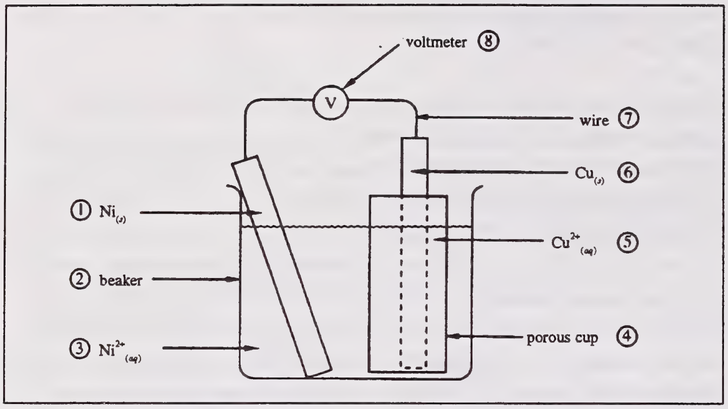
Numerical Response

Almost all students correctly followed the instructions for filling in the answer sheet. Fewer than 10 students wrongly recorded correct answers. These students were not penalized; however, students who did not round their answers as instructed lost marks.

Question	Answer	Difficulty*
1	2, 1, 4, 3	47.1
2	14.8	49.7
3	3, 4, 2, 1	45.6
4	3.72	55.1
5	1.56	63.1
6	1, 6, 1, 5	29.2
7	73.2	35.1

*Difficulty—percentage of students answering the question correctly

Use the following diagram to answer question 6.



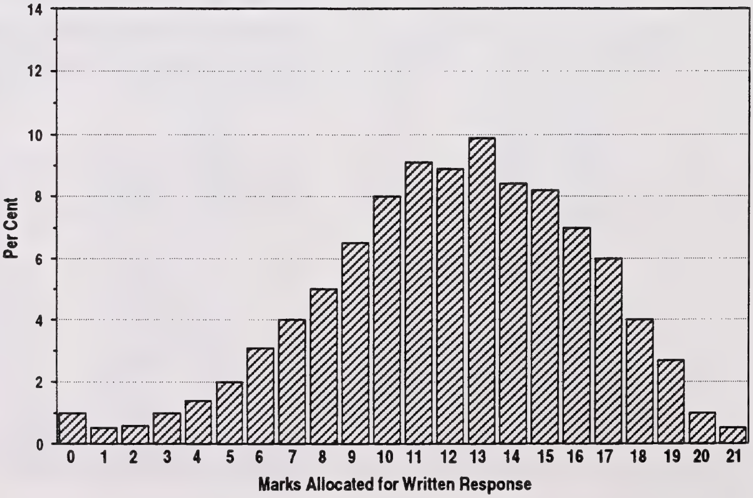
6. When the electrochemical cell is operating, the

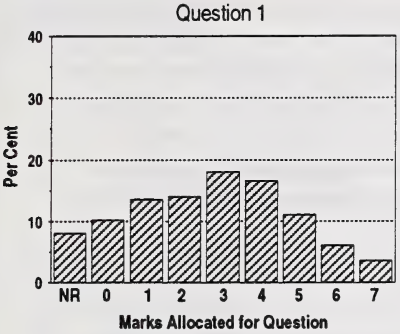
- anode is ______ (record in first column)
- cathode is ___ (record in second column)
- reducing agent is ______ (record in third column)
- oxidizing agent is ______ (record in fourth column)

The average for **question 6** was 29.2%. The question discriminated well between strong and fairly strong students. The most frequent mistake students made (19.0%) was to select $Ni^{2+}_{(aq)}$ as the cathode. The next most common mistake (11.4%) arose from the assumption that oxidizing agents are oxidized and reducing agents are reduced. Of this 11.4%, almost two-thirds of the students were able to correctly identify the anode and cathode. The results for this question suggest that students achieving the standard of excellence can successfully extract valid inferences from diagrammatic data.

Written Response

The level of achievement on the written-response section was better than expected: about two-thirds of the students (66.0%) achieved a mark of 11 or higher out of 21. This result was obtained in spite of the fact that students did not perform as well as expected on question 2.



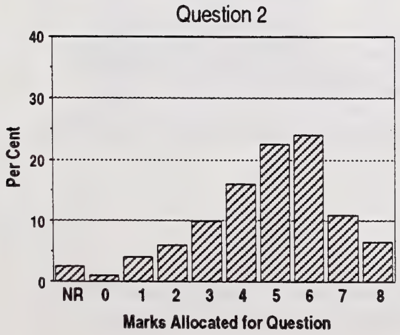


Question 1 was answered better than expected. This question was expected to distinguish between students at the acceptable standard and those at the standard of excellence. Thus, slightly less than two-thirds (63.9%) of the students were unable to solve the question and, as a result, obtained a mark of 3 or less. This was due in part to the dual purpose of the question: the first purpose was to measure students' ability to write a laboratory procedure, and the second purpose was to test students' understanding of calorimetry and specific heat capacity. A student who did well on only one of these components generally received 4 marks, but a student who completed both could attain the standard of excellence. Students who did not meet the acceptable standard were unable to address either part of the question. Many tried to measure the metals' heat of fusion or heat of reaction. Most of these students were unable to experimentally determine a specific heat capacity. They had difficulty expressing themselves and, as a result, their responses required interpretation.

Students who attained the acceptable standard but not the standard of excellence often had a good understanding of the concept but lacked organizational skills, or vice versa. These students had great difficulty coming up with a method to measure the initial temperature of the metal. Many of these students arranged their steps in an impossible chronological order. However, these students were generally able to communicate their ideas so that little if any interpretation was required.

Students who attained the standard of excellence identified both components of the question. The error that prevented these students from earning full marks for this question was the failure to determine the highest/lowest temperature reached by the calorimeter. These students presented all their steps in a logical order and expressed themselves clearly so that no interpretation was required by the examiner.

On this 7-mark question, the average mark was 2.71 or 39% of the available mark.

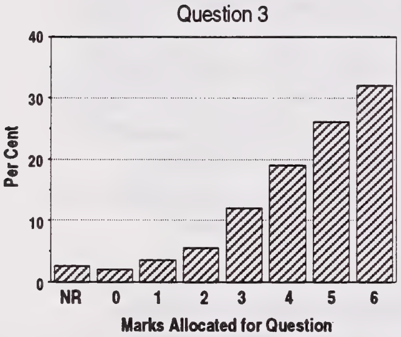


Question 2 was not answered as well as expected. Students who did not attain the acceptable level on the examination were expected to score up to 3 on this question. These students had difficulty in identifying the essential observation and recalling fundamental empirical definitions. Many of these students assumed that there was one of each type of solution and assigned an unknown to each classification, with no attempt at an explanation.

Students who attained the acceptable level on the examination were expected to score 4 or higher on this question; most attained a mark of either 5 or 6. Students correctly identified the nature of each solution and explained how they reached their conclusion. However, they were unable to clearly identify the essential observation that led to each successful identification, and as a result, tended to repeat the observations given in the question rather than analyse them.

Students who attained the standard of excellence on this question were expected to score 7 or 8, and they did. They clearly communicated their understanding of the nature of solutions and were able to discriminate between relevant and irrelevant data. Some of these students went beyond the expectations of the question and correctly identified the strength of the acidic solutions.

On this 8-mark question, the average mark was 4.83 or 60% of the available mark.



Question 3 was answered better than expected. This question was expected to distinguish between students below the acceptable standard and those at the acceptable standard. Students who did not attain the acceptable level on the examination scored 0 to 3. These students had difficulty selecting appropriate half-reactions. Many wrote an unbalanced non-ionic chemical equation involving substances that do not exist. They also had difficulty determining the moles of $AgNO_{3(aq)}$. Most of these students used the molar mass of $AgNO_{3(s)}$ to calculate the moles of $AgNO_{3(aq)}$. In addition, these students appeared not to have a concept of what an observation is.

Students who attained the acceptable level on the examination were expected to score 4 or better. These students used half-reactions to predict the net ionic equation and generally used the correct mole ratio to determine their final answer correctly. They had difficulty giving an observation that was reasonable; many gave a correct statement rather than an observation. These students had difficulty using units, states, and significant digits. In general, the responses by these students were well-written and fairly well-organized.

Students who attained the standard of excellence were expected to score 6 and make no errors, and they did.

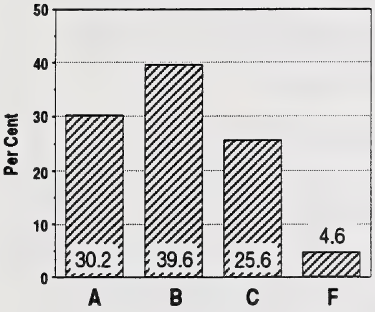
On this 6-mark question, the average mark was 4.41 or 74% of the available mark.

For further information, contact Don Loerke, Lowell Hackman, or Phill Campbell at the Student Evaluation Branch, 427–0010.

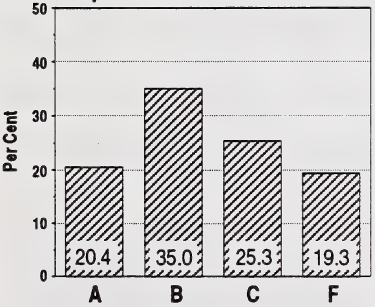
Physics 30

Diploma Examination Results
Examiners' Report for January 1992

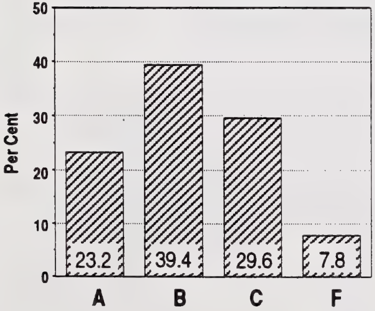
School-Awarded Mark



Diploma Examination Mark



Final Blended Mark



The summary information in this report provides teachers, school administrators, students, and the general public with an overview of results from the January 1992 administration of the Physics 30 Diploma Examination. The information is most helpful when used in conjunction with the detailed school and jurisdiction reports that have been mailed to schools and school jurisdiction offices. An annual provincial report containing a detailed analysis of the combined January, June, and August results will be available next fall.

Description of the Examination

The Physics 30 Diploma Examination consists of three parts: a multiple-choice section of 42 questions worth 60%, a numerical-response section of seven questions worth 10%, and a written-response section of four questions worth 30% of the total examination mark.

Achievement of Standards

The information reported is based on the final blended marks achieved by 3 338 students who wrote the January 1992 examination.

- 92.2% of these students achieved the acceptable standard (a final blended mark of 50% or higher).
- 23.2% of these students achieved the standard of excellence (a final blended mark of 80% or higher).

Overall, student performance in Physics 30 was satisfactory. Students' problem-solving skills continued to improve and they had a good understanding of course content.

Provincial Averages

- The average school-awarded mark was 71.2%.
- The average diploma examination mark was 64.9%.
- The average final blended mark, representing an equal weighting of the school-awarded mark and the diploma examination mark, was 68.4%.

Results and Examiners' Comments

Subtest

When analysing any detailed examination results, please bear in mind that subtest results **cannot** be directly compared.

Results are in average raw scores.

Machine scored: 33.4 out of 48

Written response: 11.3 out of 21

- **Course Content**
  - -Light: 10.0 out of 16
  - -Electric and Magnetic Fields: 12.0 out of 18
  - -Electromagnetic Radiation: 6.8 out of 10
  - -Structure of Matter: 8.8 out of 14
  - -Modern Physical Theories: 7.1 out of 11
- **Process Skills:** 21.0 out of 37
  - -Multiple-choice questions 5, 10, 17, 18, 19, 22, 23, 24, 27, 28, 34, 35, 40; numerical-response questions 3, 4, 6; and written-response questions 1, 2, 3, and 4
- **Cognitive Levels**
  - -Knowledge: 12.0 out of 17
  - -Comprehension and Application: 22.9 out of 34
  - -Higher Mental Activities: 9.7 out of 18

Examination Blueprint

Each question on the examination is classified in two ways: according to the curricular content area being tested and according to the cognitive level demanded by the question. The examination blueprint illustrates the distribution of questions in January 1992 according to these classifications. Numbers with brackets [ ] indicate written-response questions, those with parentheses ( ) indicate numerical-response questions, and those without brackets or parentheses are multiple-choice questions.

Reporting Category	**Questions by Cognitive Level**			**Examination Emphasis (%)**
	Knowledge	**Comprehension and Application**	**Higher Mental Activities**	
Light	3, 4, 6, 8	1, 2, 5, 7, (1), (2)	[3]	23
Electric and Magnetic Fields	9, 11, 14, 15, 16	10, 12, 13, 18, 20*, (3), [2]	17, 19, (4)	27
Electromagnetic Radiation	21, 25	22, 23, 26, 27, 29 (5)	24, 28	14
Structure of Matter	30, 32, 33, 36	31, 37, (6) [4]	34, 35	20
Modern Physical Theories	38, 42	39, 40, 41, (7)	[1]	16
Examination Emphasis (%)	24	50	26	100

* Note: Question 20 was deleted from the examination.

This examination has a balance of question types and difficulties. It is designed so that students capable of achieving the acceptable standard will obtain a mark of 50% or higher and students capable of achieving the standard of excellence will obtain a mark of 80% or higher. For the first time, the examination includes numerical-response questions. Students handled these questions very well. Students achieving the acceptable standard were expected to show good communication skills in the written-response section of the examination, regardless of whether their responses were in calculation or verbal form.

Multiple Choice

Question	Key	Difficulty*
1	D	91.6
2	A	52.6
3	A	47.0
4	C	73.2
5	C	57.1
6	A	67.6
7	D	89.2
8	B	68.9
9	C	70.9
10	D	88.9
11	D	83.8
12	C	63.2
13	C	75.9
14	A	81.6
15	B	78.8
16	C	73.0
17	D	45.1
18	B	52.4
19	A	68.2
20	question deleted	
21	C	92.5
22	D	54.6
23	A	59.1
24	A	49.3
25	B	70.9
26	A	89.9
27	B	58.9
28	B	55.7
29	D	69.7
30	D	53.7
31	D	88.9
32	C	72.3
33	A	84.2
34	B	71.1
35	D	49.9
36	A	73.4
37	C	64.9
38	D	46.1
39	B	86.9
40	B	81.0
41	D	78.1
42	A	64.6

*Difficulty—percentage of students answering the question correctly

All students were expected to demonstrate a high level of competence in calculations. Those achieving the standard of excellence were expected to apply their knowledge to unusual problems and to use scientific generalizations effectively. Performance on the multiple-choice section of the examination was generally satisfactory. Students found the calculation questions to be the easiest. The multiple-choice average score was 69.6%. Detailed comments on question 24 and 34 follow.

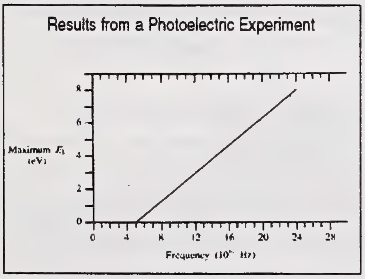
For a complete breakdown of student responses by alternative for the multiple-choice questions, please refer to the school and jurisdiction reports.

24. A garage door opener is designed so that it has an operational distance equal to 55 wavelengths. When the frequency is reduced from 205 MHz to 155 MHz, the **increase** in operational distance is

- ● A. 26 m
- B. 80 m
- C. 110 m
- D. 330 m

Question 24 asked students to apply their knowledge to a common experience. The operational range for a transmitter of a garage door opener was given in terms of wavelength. Students were expected to find the increase in range that would correspond to a decrease in frequency. Students achieving the standard of excellence had little difficulty with this question. Less than half of those achieving at the acceptable standard but not achieving the standard of exellence answered this question correctly. The most common mistake was calculating one or both of the ranges and failing to find the difference. A small number of students who understood that the difference in the range was required used the difference in the frequencies to calculate the answer.

Use the following diagram to answer question 34.


Results from a Photoelectric Experiment

34. The maximum kinetic energy of the photoelectrons that are emitted by light of wavelength 1.7×10^{-7} m is

- A. 1.1 eV
- ● B. 5.2 eV
- C. 6.2 eV
- D. 7.3 eV

In **question 34,** students were expected to find the frequency of the incident light and to use this frequency to calculate the kinetic energy transferred to an electron. This could have been done by either using the graph to interpolate an energy value on the vertical axis corresponding to *f* or by using the appropriate kinetic energy equation from the data booklet. The second option required students to determine the threshold frequency from the graph. Almost three-quarters of the students achieving at the acceptable standard answered this question correctly. Students who chose incorrect answers tended to ignore the work function in the conservation of energy equation.

Question 20 was deleted because the diagram was considered to be ambiguous. Since the north-seeking pole of the compass was not explicitly indicated, two answers could be considered correct, depending on a student's definition of the north-seeking pole.

Numerical Response

Question	Answer	Difficulty*
1	25.4	85.2
2	2.78	78.5
3	8.72	45.8
4	2.16	67.1
5	2.19	76.2
6	2.68	70.9
7	4.56	72.5

*Difficulty—percentage of students answering the question correctly

Most students correctly followed the instructions for filling in the answer sheet. Students who did not round their answers as instructed lost marks. This occurred most frequently in question 1, where it appears students truncated an answer of 25.3 from their calculators instead of rounding the value to the correct answer of 25.4.

All seven questions discriminated well between those students who reached an acceptable standard and those who did not. These questions showed that students achieving the acceptable standard can generate correct responses rather than just select one response from the four provided in the multiple-choice format.

2. Light of wavelength 5.73×10^{-7} m illuminates a double slit. On a screen 2.00 m away from the slit, an interference pattern is formed with fringes that are 4.12 mm apart. The distance between the slits, expressed in scientific notation, is $b \times 10^{-w}$ m. The value of *b* is ____. (Round and record your answer to three digits.)

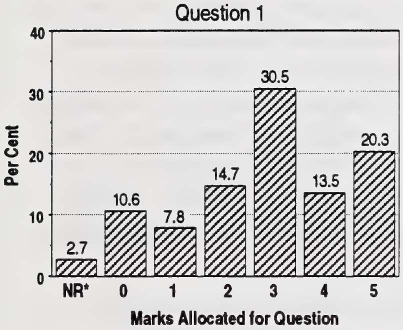
Question 2 was answered correctly by 78.5% of the students. Students were expected to use Young's equation to find the slit separation for a double slit. Students achieving at the acceptable standard were expected to answer this question correctly. Well over half the students achieving just below this standard answered this question successfully. The most common mistake students made was incorrectly substituting 5.73×10^{-7} m for d and solving for λ.

3. Alpha particles, trapped by a magnetic field, are in an orbit of radius 4.36 cm. If the velocity of the particles is exactly doubled, the new radius will be ____ cm. (Round and record your answer to three digits.)

Question 3 was the most difficult question in the numerical-response section, with 45.8% of the students answering it correctly. Students were expected to equate centripetal force and magnetic force and to realize that R is proportional to v when q, m, and B are unchanged. This question proved challenging for most students. Almost one-third of students achieving the standard of excellence and more than half of those achieving the acceptable standard answered the question incorrectly. Of those students answering incorrectly, 17.5% found that the radius would increase by a factor of four and 10.3% thought the radius would decrease by a factor of two.

Written Response

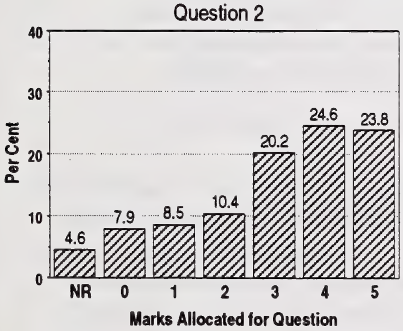
The four questions in the written-response section were created from four of the five strands for Physics 30. Students' problem-solving skills were tested most in questions 1 and 2, part c of question 3, and in part b of question 4. Students achieving the acceptable standard on this examination were expected to get 2 out of 5 marks for questions 1 and 4, 3 out of 5 marks for question 2, and 2 out of 6 marks for question 3. Students performing at the standard of excellence were expected to obtain close to full marks for questions 1 and 2, 4 out of 6 marks for question 3, and 4 out of 5 marks for question 4.



*NR—No Response

Students did not perform as well as expected on **question 1.** They were required to calculate the relativistic mass for an electron and use this mass to find the electron's kinetic energy and its de Broglie wavelength. Students who achieved the standard of excellence answered the question very well. The lack of structure did not cause much difficulty for this group. Students achieving the acceptable standard but not the standard of excellence were able to calculate the relativistic mass as expected. Many of these students then had difficulty selecting the correct equation for kinetic energy and often used the equation for the energy of a photon to calculate the de Broglie wavelength. A significant number of these students found the kinetic energy or the de Broglie wavelength but not both.

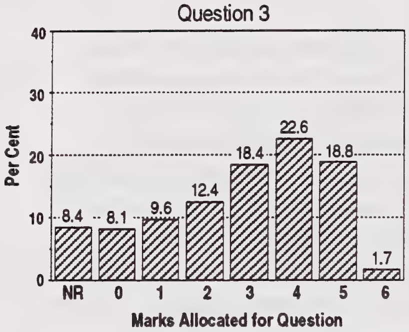
On this 5-mark question, the average score was 2.84 or 57%.



Question 2 was answered quite well. In part a, students achieving the acceptable standard were expected to use the graph to determine the resistance of a wire for two different temperatures. They were then to calculate the decrease in current corresponding to this temperature increase. Students achieving the acceptable standard but not the standard of excellence consistently read the resistance at 24°C to only one decimal place of accuracy, whereas the graph allowed a reading of two decimal places. It seems that these students were unaware that graphs can be read to an acccuracy of one-half of the smallest unit. A number of students did not find the change in current even though they successfully calculated the initial current and the final current.

Part b should have been a routine calculation for students achieving the acceptable standard. Students were able to read the necessary values from the graph but consistently had difficulty solving for α and/or using the correct units.

On this 5-mark question, the average score was 3.07 or 61%.



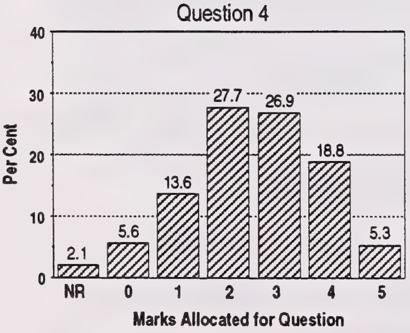
Question 3 proved to be the most challenging for all students. In part a, students were asked to suggest an experimental design that would indirectly measure the width of a double slit. Physics 30 students are generally familiar with Young's experiment and consequently were expected to suggest variations of this experiment as one method. However, many students achieving below the standard of excellence did not specifically state what equipment and measurements were necessary even though they were specifically asked to do so.

Part b was answered fairly well. Most students used an algebraic example rather than a numerical one.

Part c was the most difficult part of this question and was intended to discriminate between those students who achieve the standard of excellence and those who do not. Students were expected to estimate the uncertainties in their measurements and to explain or determine how these uncertainties would affect their result. Many did not estimate their uncertainties but simply stated where errors in measurement would occur, or students dealt with the effects of l or x on the slit-separation calculation rather than explaining the effects of the uncertainties in these values.

This question was marked for communication skills. Students achieving the standard of excellence generally showed good communication skills. Their answers demonstrated the clarity and the necessary specificity that was requested. Students achieving below the acceptable standard offered answers that generally required interpretation on the part of the examiner. Their responses were often less specific and less organized than the responses of those achieving the standard of excellence.

On this 6-mark question, the average mark was 2.84 or 47%.



In the first part of **question 4,** students were asked to calculate the slope of a graph for data from a photoelectric experiment. Students achieving the acceptable standard were expected to receive close to full marks for this part. The most frequent mistakes were in the reading and substitution of data points. A significant number of students did not realize that the horizontal and vertical axes had different scales, and they therefore substituted incorrect values into a slope formula. Many of these students also neglected to include the powers of ten in their slope calculation, or they simply included the correct power of ten in their final answer with no evidence of where it came from.

Part b was not answered as well as expected. Students were again given a problem that could have been solved by graphing, but many students atttmpted to solve it by using a more difficult algebraic method. By extending the graph upwards, students could interpolate the value for kinetic energy from the vertical axis corresponding to a given frequency on the horizontal axis. The only calculation necessary was that of the frequency of the incident light. Students achieving the standard of excellence did well using both solutions, with over half getting close to full marks. Those students achieving below this standard tended to use the algebraic solution and had difficulty with one or more parts; many were unable to find the threshold frequency and the work function, or they simply equated the energy of the incident photon to the energy of the ejected electron. A surprising number of students offered solutions using the slope-intercept or point-slope form for the equation of a line without actually using the conservation of energy laws.

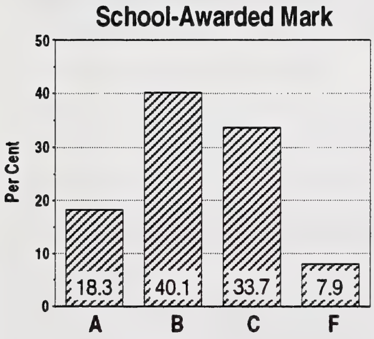
On this 5-mark question, the average mark was 2.51 or 50%.

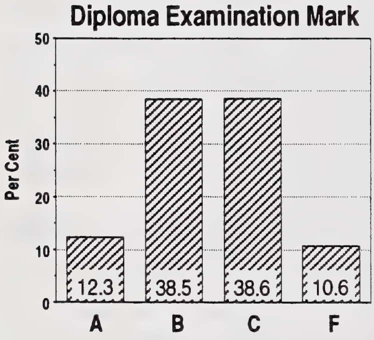
For further information, contact Craig Ember, Lowell Hackman, or Phill Campbell at the Student Evaluation Branch, 427–0010.

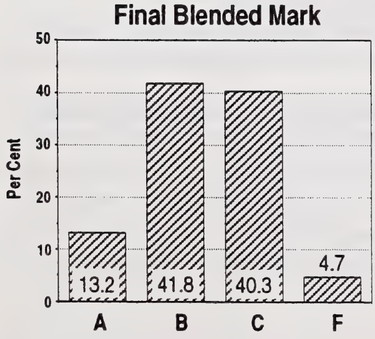
Section 2: June 1992 Examiners' Reports

English 30

Diploma Examination Results
Examiners' Report for June 1992


School-Awarded Mark


Diploma Examination Mark


Final Blended Mark

The summary information in this report provides teachers, school administrators, students, and the general public with an overview of results from the June 1992 administration of the English 30 Diploma Examination. This information is most helpful when used in conjunction with the detailed school and jurisdiction reports that have been mailed to schools and school jurisdiction offices. An annual provincial report containing a detailed analysis of the combined January, June, and August results will be available this fall.

Description of the Examination

The English 30 Diploma Examination consists of two parts: a written-response section and a reading section. Each part is worth 50% of the total examination mark.

Achievement of Standards

The information reported is based on the final blended marks achieved by 14 176 students who wrote the June 1992 examination.

- 95.3% of these students achieved the acceptable standard (a final blended mark of 50% or higher).
- 13.2% of these students achieved the standard of excellence (a final blended mark of 80% or higher).

The competence of students achieving the standard of excellence in writing was impressive. However, the skills students at the satisfactory level demonstrated tended to be uneven; students showed ability on occasion to use language well, but this was not always sustained.

Provincial Averages

- The average school-awarded mark was 66.7%.
- The average diploma examination mark was 64.9%.
- The average final blended mark, representing an equal weighting of the school-awarded mark and the diploma examination mark, was 66.2%.

Part A: Written Response

Part A: Written Response is written at a different time from *Part B: Reading*. Students are required to complete two writing assignments related to the same piece of literature. Both assignments assess a variety of writing and thinking skills.

Readers will find the results most meaningful in the context of the assignments and the scoring descriptors. The most useful starting place for reviewing these results is at the **(3) Satisfactory** level. Such work exceeds the pass mark of 50%. The scoring guides that describe proficiency levels are in the *English 30 Diploma Examination Update for 1992,* which is available in all schools.

The table below outlines the requirements for each assignment, the categories for scoring each assignment, the amount each category contributes to the total mark (parts A and B combined), and the percentage of students achieving at the various levels.

Examination Blueprint and Percentage Distribution of Scores

Description of the Writing Assignment	**Scoring Category**	**Proportion of Total Mark (%)**	**Percentage Distribution of Scores**					
			(5) Excellent	**(4) Proficient**	**(3) Satisfactory**	**(2) Limited**	**(1) Poor**	**Ins***
Minor Assignment The student is required to write a personal response to the reading selection provided in the examination.	1. Thought and Detail	7.5	2.4	30.0	57.5	9.3	0.6	0.2
	2. Writing Skills	7.5	2.5	28.0	57.4	10.9	0.9	0.2
Major Assignment The major assignment maintains a thematic connection to the minor assignment. The student is required to demonstrate an appreciation of literary works studied in class by discussing theme and the literary techniques that the author uses to support that theme. The student is also required to synthesize thoughts clearly and correctly in writing.	1. Total Impression	5.0	2.4	18.6	56.5	21.3	0.9	0.3
	2. Thought and Detail	12.5	2.6	19.7	48.3	27.4	1.7	0.3
	3. Organization	7.5	2.5	20.7	59.9	15.9	0.7	0.3
	4. Matters of Choice	5.0	3.2	22.7	59.5	13.5	0.9	0.3
	5. Matters of Convention	5.0	4.1	25.8	52.9	15.5	1.4	0.3

***Ins** (Insufficient) is a special category that includes students who did not attempt the assignment, who wrote too little to evaluate, or who wrote answers that were completely off topic.

Note: The shaded portion represents the percentage of students who achieved or exceeded a **(3) Satisfactory** level of performance.

Examiners' Comments

Minor Assignment: Personal Response to Literature

In the literature selection, which was an excerpt from the novella *The Secret Sharer*, a young man chooses to seize the moment in spite of the uncertainty of the consequences. The assignment required students to "discuss the significance of personal choices."

Students appeared to appreciate the positive implication of tone and situation in this passage (e.g., "Let them think what they liked, but I didn't mean to drown myself. I meant to swim till I sank—but that's not the same thing.") Students seemed to have no difficulty selecting quotations from the excerpt and relating them to their own experiences. Many responses were of a philosophical nature; overall, the responses were lively and heartfelt. Clearly, students were able to relate to the subject of choices, likely seeing themselves as "swimmers in the sea of life."

Students achieving overall scores of **(3) Satisfactory** chose an appropriate quotation and often described a personal decision or choice they considered to be significant; for example, deciding to remain in a situation that involved some hardship instead of giving up. Many presented a philosophical discussion about the importance of making the right choice. Frequently, students chose some part of the sentence "I kicked off my slippers and was in the water before I had made up my mind fairly" to illustrate metaphorically the dramatic quality of decision making. Students writing at the **(3) Satisfactory** level produced clear and generally straightforward writing. They made some errors in spelling and punctuation, subject-verb agreement, pronoun-antecedent agreement, and verb tense agreement. Generally, however, their writing showed control of conventions.

Students achieving overall scores of **(4) Proficient** and **(5) Excellent** often responded to the less dramatic details of the swimmer's choice; for example, "I don't know that I meant to do anything," "[I] was in the water before I had made up my mind fairly," and "[the light was] something to swim for." These students recognized that sometimes the most significant decisions are not made with great deliberation, or that what appears to others to be a choice is not really a choice but an almost instinctive action guided by individual character.

Major Assignment: Literature Composition

Students appeared to have little difficulty choosing literature in which the author "examines the basis for and impact of individual choices." Students achieving overall scores of **(3) Satisfactory** presented a clear, controlling idea and often described the choices made by one or more characters. Students writing at this level frequently suggested, explicitly or implicitly, that the author's purpose was to illustrate that bad choices produce bad consequences. These students appeared to consider literature to be a documentary of a character's life rather than an artistic examination of the human condition; consequently, some students suggested that the central character "should have made a different choice."

Students achieving overall scores of **(4) Proficient** and **(5) Excellent** showed their confidence by selecting examples from literature that illustrated the complexity of individual choices. They usually gave more consideration to the source of weakness, strength, or motivation within a character than to the "rightness or wrongness of that character's choice." Their language skills served to enhance and clarify thought and detail, and they used repetition and parallelism to achieve emphasis and conciseness. The complex structures these students used contributed to the effectiveness of their writing.

Question-by-Question Results

Question	Key	Difficulty*
1	D	82.0
2	B	76.1
3	C	66.6
4	B	71.6
5	A	65.5
6	A	56.9
7	D	74.2
8	A	54.4
9	D	50.3
10	D	51.1
11	A	77.7
12	C	51.9
13	A	72.3
14	A	65.6
15	C	80.9
16	B	72.5
17	C	77.5
18	C	48.3
19	C	79.2
20	D	68.8
21	D	69.4
22	B	81.5
23	B	78.9
24	B	74.1
25	D	41.5
26	B	46.3
27	C	44.8
28	D	61.5
29	D	63.8
30	D	55.3
31	A	80.2
32	C	68.7
33	B	75.7
34	B	63.8
35	D	75.3
36	B	58.2
37	C	80.7
38	B	79.5
39	C	83.6
40	A	58.7
41	D	88.4
42	D	56.9
43	B	71.1
44	B	65.9
45	C	70.6
46	D	72.4
47	D	73.7
48	A	55.4
49	B	73.0
50	D	81.4
51	C	45.8
52	C	87.1
53	C	38.4
54	B	55.7
55	A	49.7
56	D	76.6
57	A	69.3
58	B	71.6
59	A	54.3
60	C	60.5
61	A	71.0
62	B	70.4
63	C	75.6
64	D	71.9
65	A	83.2
66	A	69.8
67	B	76.7
68	A	62.3
69	C	73.8
70	A	67.5

*Difficulty—percentage of students answering the question correctly

Part B: Reading

The table at the left shows question-by-question results and the keyed answers. Parallel tables in the school and jurisdiction reports show the percentage of students who selected each alternative. From this table, teachers can determine areas of strength and weakness in the achievement of their students relative to the province as a whole and, consequently, areas of strength and weakness in their own programs.

Examination Blueprint

Part B: Reading has a value of 70 marks, one mark for each multiple-choice question. Each question is classified in two ways: according to the curricular content area being tested and according to the thinking (process) skill demanded by the question. The examination blueprint illustrates the distribution of questions in June 1992 according to these classifications.

	Classification by Thinking Skills			
Classification by Course Content	**Literal Understanding**	**Inference and Application**	**Evaluation**	**Total**
1. Meanings	10, 11, 13, 15, 67	1, 4, 19, 20, 22, 23, 24, 25, 28, 41, 42, 44, 45, 49, 50	5, 12, 14, 16, 18, 29, 36, 47, 51, 52	30 items (22%)
2. Critical Response	59	3, 6, 7, 9, 17, 27, 33, 35, 40, 43, 48, 55, 56, 57, 58, 61, 63, 69	8, 32, 46, 53, 54, 60, 62	26 items (18%)
3. Human Experience and Values	26	2, 30, 34, 37, 38, 39, 64, 65, 66, 68	21, 31, 70	14 items (10%)
Total	7 items (5%)	43 items (31%)	20 items (14%)	70 items (50%)

Subtest Results

Results are in average raw scores.

Total Part B: 47.2 out of 70

Subtest Results:**

Course Content

- Meanings: 20.7 out of 30
- Critical Response: 16.7 out of 26
- Human Experience and Values: 9.9 out of 14

Readers are cautioned **not to compare subtest results because the subtests are not of equal difficulty. Instead, readers should compare these provincial subtest results with their own school subtest results.

During the marking session, a committee of 10 classroom teachers of English 30 reviewed the June 1992 English 30 *Part B: Reading* examination to determine whether the standards embedded in the readings and the questions were appropriate and fair. The committee members generally concurred that the examination set an appropriately demanding standard of achievement for graduating English 30 students. Item analysis revealed no statistically problematic questions. Three committee members felt that the opening passage, "The Days of the Unicorns," was too difficult to be placed at the beginning of the readings. However, the average difficulty (percentage of students answering correctly) for the questions on this passage, questions 1 to 9, was 66.4%.

The second reading passage, which was taken from "The Wrong Ism," was described by committee members as being difficult and abstract but appropriate and timely in view of current Canadian politics. Indeed, students managed questions 10 to 18 very well. Question 17, for example, required a high level of skill in both reading comprehension and in application of knowledge of literary techniques; 77.5% of all students answered this question correctly.

The following table gives results for three multiple-choice questions. For each question, statistics are given for three student groups. The comments following the table discuss some of the decisions that students may have made and some of the skills they may have used to answer these questions correctly. The three questions are based on the excerpt from the play *Medea*.

Percentage of Students Correctly Answering Selected Multiple-Choice Questions

	Question Number		
Student Group	**25**	**26**	**27**
All students	41.5	46.3	44.8
Students achieving the standard of excellence (80% or higher, or A) on the whole examination	73.1	74.1	83.2
Students achieving the acceptable standard who received marks between 50% and 64%, or C, on the whole examination	28.4	38.4	28.8

Examiners' Comments

Although the review committee considered the excerpt from *Medea* to be very difficult, the average difficulty for the first six questions on the passage (questions 19 to 24) was 75.3%. All nine questions dealt with Creon's commandment sending Medea into exile and with Medea's bitterness and desperation as she pleads for a one-day stay of exile.

Question 25 required students to understand the expressions "quick of wrath" and "cold and still" that Creon uses as he considers his response to Medea's assurances that she means him no harm. Of the students who achieved marks between 50% and 64% on the whole examination (parts A and B), 32.9% chose alternative B and 32.7% chose alternative C, likely because of the words "quick" and "anger" in the stem of the question. A rereading of Creon's speech (lines 58–63) should have clarified Creon's concern.

25. Creon's statement "A woman quick of wrath. . . Is easier watching than the cold and still" (lines 62-63) suggests that anger is more dangerous when it is

A. violent
B. impulsive
C. vindictive
● **D.** calculated

26. Creon justifies the "tenderness" in his change of decision (lines 94-105) on the grounds that

A. Medea's children depend on him
● B. little harm can be done in a day
C. his suspicions have been allayed
D. he is known for his wise judgment

Question 26 was classified as a "literal understanding" question. Although Creon admits to feeling uneasy, he relents on his commandment of immediate banishment and allows Medea one more sunrise in Corinth. Again, students were required to read Creon's entire speech (lines 94–105) to find his justification: that one day could not bring "those perils wrought." Students achieving less than 50% on the whole examination who answered this question incorrectly may not have reread Creon's entire speech, or they may not have deciphered the meaning of "perils wrought." These students were attracted to alternative C (24.2%) and to alternative D (32.5%). Of the students who achieved marks between 50% and 64% on the whole examination, 31.2% chose alternative D. These students may have attempted to relate "wisest counsels" in line 96 to "wise judgment" in alternative D without considering the ultimate point of Creon's comments.

27. In Creon's final speech, the phrases "marred the chime" (line 95), "mere folly" (line 97), and "dread yet haunteth me" (line 105) serve to convey his sense of

A. control
B. generosity
● C. foreboding
D. reconciliation

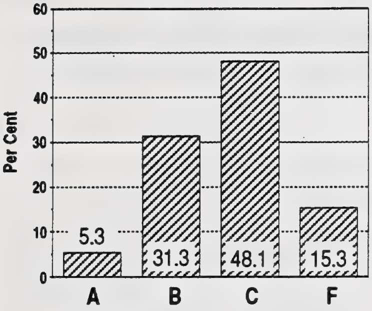
Question 27 required that students recognize the writer's effective use of imagery to suggest Creon's state of mind. All the alternatives could reasonably describe the way Creon is feeling. He has softened Medea's punishment (generosity) without losing control, thus assuaging his own doubt (reconciliation)—all despite his knowing that what he does is folly (foreboding.) This question asked students to focus on specific details in Creon's speech. It would appear that vocabulary was the main challenge here. Many students achieving marks between 50% and 64% on the whole examination may have guessed and/or may not have been familiar with the meaning of "foreboding." These students were drawn to alternatives A, B, C, and D in almost equal numbers. Those students who chose alternative C recognized that "marred," "folly," "dread," and "haunteth" suggest "foreboding."

For further information, contact Gail Gates, Tom Dunn, or Elana Scraba at the Student Evaluation Branch, 427–0010.

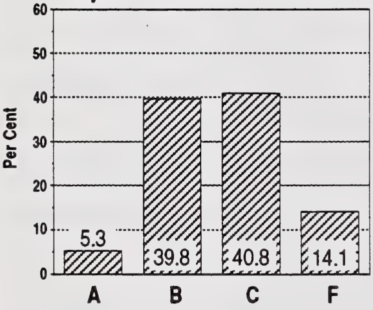
English 33

Diploma Examination Results
Examiners' Report for June 1992

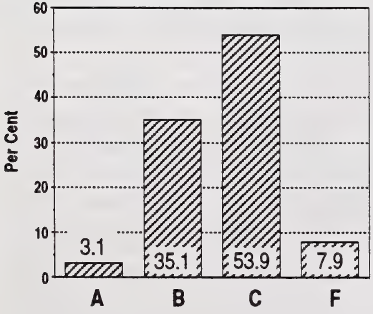
School-Awarded Mark



Diploma Examination Mark



Final Blended Mark



The summary information in this report provides teachers, school administrators, students, and the general public with an overview of results from the June 1992 administration of the English 33 Diploma Examination. This information is most helpful when used in conjunction with the detailed school and jurisdiction reports that have been mailed to schools and school jurisdiction offices. An annual provincial report containing a detailed analysis of the combined January, June, and August results will be available this fall.

Description of the Examination

The English 33 Diploma Examination consists of two parts: a written-response section and a reading section. Each part is worth 50% of the total examination mark.

Achievement of Standards

The information reported is based on the final blended marks achieved by 5 140 students who wrote the June 1992 examination.

- 92.1% of these students achieved the acceptable standard (a final blended mark of 50% or higher).
- 3.1% of these students achieved the standard of excellence (a final blended mark of 80% or higher).

Generally, student achievement in English 33 was satisfactory. Proportions of students achieving the acceptable standard and the standard of excellence remained relatively consistent compared with such proportions in June 1991 and January 1992. English 33 students continue to meet expectations.

Provincial Averages

- The average school-awarded mark was 60.0%.
- The average diploma examination mark was 62.2%.
- The average final blended mark, representing an equal weighting of the school-awarded mark and the diploma examination mark, was 61.6%.

Part A: Written Response

Part A: Written Response is written at a different time from *Part B: Reading*. Students are required to complete three writing assignments, each of which assesses a variety of writing and thinking skills.

Readers will find the results most meaningful in the context of the assignments and the scoring descriptors. The most useful starting place for reviewing these results is at the **(3) Satisfactory** level. Such work exceeds the pass mark of 50%. The scoring guides that describe proficiency levels are in the *English 33 Diploma Examination Update for 1992,* which is available in all schools.

The table below outlines the requirements for each assignment, the categories for scoring each assignment, the amount each category contributes to the total mark (parts A and B combined), and the percentage of students achieving at the various levels.

Examination Blueprint and Percentage Distribution of Scores

Description of the Writing Assignment	Scoring Category	Proportion of Total Mark (%)	Percentage Distribution of Scores					
			(5) Excellent	(4) Proficient	(3) Satisfactory	(2) Limited	(1) Poor	Ins*
Personal Response to Literature The student is required to discuss an aspect of literature from a personal perspective.	1. Thought and Detail	10.0	0.9	23.3	60.8	14.2	0.6	0.2
	2. Organization	5.0	1.1	20.8	66.0	11.3	0.7	0.2
	3. Matters of Choice	5.0	1.2	18.3	66.9	12.5	0.9	0.2
	4. Matters of Convention	5.0	2.1	22.9	56.5	16.9	1.5	0.2
Functional Writing The assignment is functional in nature. The student is required to write about a given situation.	1. Thought and Detail	10.0	1.4	21.7	53.3	20.8	2.4	0.3
	2. Organization	2.5	1.6	20.8	59.9	16.2	1.2	0.3
	3. Writing Skills	2.5	1.6	17.8	60.7	17.9	1.7	0.3
Response to Visual Communication The writing assignment is connected to one or more photographs and/or cartoons. The student is required to write about main ideas and techniques of visual communication.	1. Thought and Detail	5.0	0.7	11.3	49.8	33.3	3.0	1.9
	2. Organization	2.5	0.7	9.6	54.4	31.1	2.4	1.9
	3. Writing Skills	2.5	1.1	13.3	60.7	20.5	2.5	1.9

***Ins** (Insufficient) is a special category that includes students who did not attempt the assignment, who wrote too little to evaluate, or who wrote answers that were completely off topic.

Note: The shaded portion represents the percentage of students who achieved or exceeded a **(3) Satisfactory** level of performance.

Examiners' Comments

The excerpt from Ernest Buckler's novel *The Mountain and the Valley* that appeared in the **Personal Response to Literature** section evoked many interesting responses. Students explored themes such as "the sweet taste of triumph resulting from the mastery of a new skill brings a new perspective as to how one views the world," "seemingly small achievements can spur us on to explore other things previously thought unattainable," and "anything is within the realm of possibilities if one has the desire and spirit to risk all in the pursuit of one's dream." The majority of students wrote a personal anecdotal response to the assignment.

Markers noted continued improvement in organization as students attempted to incorporate more complex words and structures into their writing. A similar improvement in students' grasp of mechanics and grammar, however, was not always apparent.

Those students achieving the acceptable standard demonstrated a clear understanding of the selection. Most of them readily made the connection between David's achievements and their own, and they responded in a generalized way. Some of these students referred to other literature they had studied; very few used specific quotations from the selection.

Students achieving the standard of excellence interpreted the selection in an insightful way, presented their themes confidently, and used perceptive examples from life and literature to support their ideas. These students judiciously chose quotations from the selection and skilfully embedded them in their writing. Their compositions were essentially free from errors in mechanics and grammar, and their choices were effective and polished.

In addition to observing that confidence and a sense of freedom are directly linked to personal accomplishments, these students often stressed the value that freedom bestows: the possibility of looking beyond a limited horizon and, consequently, of achieving inner peace and happiness.

Most students responded satisfactorily to the **Functional Writing** assignment. Students were required to write a letter of congratulations to the Nalwen Town Councillors for bringing the 1992 Provincial Summer Games for high school athletes to Nalwen and to suggest ways in which the students could assist with the games. Most students used a polite tone; the best responses were those that employed a tone of enthusiasm and excitement. Students achieving the acceptable standard used the information supplied in the assignment and offered general suggestions about student involvement.

The letters written by students achieving the standard of excellence demonstrated a precise awareness of audience. Many of their letters were enhanced by their inclusion of precise details, such as the revenue the games would generate for Nalwen and the way in which the games would increase Nalwen's profile. Students achieving at this level provided appropriate suggestions and precise details about how to involve students in the games.

The photograph "Used Car, 1944" that was used in the **Response to Visual Communication** section depicts a group of children playing in the skeletal remains of an old car situated in a rubble-strewn area; tall buildings are visible in the background. The boy sitting nonchalantly on the hood has a confident, happy look; another boy of about the same age, who is flashing a mischievous grin, pretends to drive the old car. A younger boy on the roof of the car brandishes a wire. The two younger passengers in the back seat seem delighted to be participating in the adventure. Students were able to generate ideas from this photograph, and markers noted that most papers were a pleasure to read. Students achieving the acceptable standard interpreted the photograph in a conventional way, discussing ideas related to "having fun," "co-operation," and "poverty and war." Fewer of the less-successful students than in the past used the photograph as a springboard for their own narratives.

Students achieving the standard of excellence presented an insightful interpretation of the photograph. Some students observed that the car was a haven for children seeking a place to play. Others explored themes such as "With youth comes the ingenuity to create a world isolated from reality" and implored adults to "attempt to retain the essence of the child within and to not allow everyday situations to destroy our capacity for joy." Other students noted that the healthy, wholesome appearance of the children foreshadowed a positive outlook for their futures.

The students achieving at the level of excellence discussed the photograph's details and photographic choices in an articulate manner. Some students noted that the sharp focus of the car and the children juxtaposed with the hazy image of the buildings in the background served to emphasize the children's success in creating their own happiness separate from the surrounding desolation. The **Response to Visual Communication** assignment requires a sustained response, and we were encouraged to note that there were very few brief responses to this particular assignment.

Part B: Reading

Subtest Results

Results are in average raw scores.

Total Part B: 44.9 out of 70

Subtest Results:*

Course Content

- Main Ideas/Details: 19.6 out of 29
- Relationship Between Form and Content: 9.4 out of 16
- Human Experience and Values: 11.3 out of 18
- Knowledge of Revision and Editing: 4.7 out of 7

*Readers are cautioned **not** to compare subtest results because the subtests are not of equal difficulty. Instead, readers should compare these provincial subtest results with their own school subtest results.

Examination Blueprint

Part B: Reading has a value of 70 marks, one mark for each multiple-choice question. Each question is classified in two ways: according to the curricular content area being tested and according to the thinking (process) skill demanded by the question. The examination blueprint illustrates the distribution of questions in June 1992 according to these classifications.

	Classification by Thinking Skills			
Classification by Course Content	**Literal Understanding**	**Inference and Application**	**Evaluation**	**Total**
Main Ideas/ Details	35, 58	2, 5, 6, 8, 9, 12, 13, 14, 19, 25, 31, 32, 36, 38, 49, 51, 52, 53, 57, 62, 66	24, 27, 29, 30, 37, 55	29 items (21%)
Relationship Between Form and Content	18, 23, 33	3, 7, 11, 16, 21, 34, 60, 67, 68, 69, 70	1, 4	16 items (11%)
Human Experience and Values		15, 20, 22, 26, 46, 50, 56, 59, 61, 63, 64, 65	10, 17, 28, 47, 48, 54	18 items (13%)
Knowledge of Revision and Editing	42, 43	39, 40, 41, 44, 45		7 items (5%)
Total	7 items (5%)	49 items (35%)	14 items (10%)	70 items (50%)

The following table gives results for five multiple-choice questions. For each question, statistics are given for three student groups. The comments following the table discuss some of the decisions that students may have made and some of the skills they may have used to answer these questions correctly.

Percentage of Students Correctly Answering Selected Multiple-Choice Questions

	Question Number				
Student Group	**4**	**11**	**17**	**18**	**69**
All students	33.4	60.4	72.8	41.0	29.2
Students achieving the standard of excellence (80% or higher, or A) on the whole examination	62.4	90.1	91.2	50.0	61.7
Students achieving the acceptable standard who received marks between 50% and 64%, or C, on the whole examination	25.3	51.9	68.2	39.4	21.6

Question-by-Question Results

Question	Key	Difficulty*
1	C	64.2
2	A	76.7
3	B	49.7
4	D	33.4
5	B	78.8
6	D	57.6
7	C	64.9
8	B	71.5
9	A	52.1
10	D	44.8
11	D	60.4
12	D	64.2
13	C	51.7
14	A	66.3
15	B	51.3
16	C	64.1
17	C	72.8
18	B	41.0
19	C	66.3
20	A	59.6
21	C	68.6
22	C	56.7
23	D	53.4
24	B	71.4
25	D	68.1
26	A	70.9
27	A	86.3
28	D	75.1
29	A	57.5
30	C	78.1
31	A	72.2
32	A	80.7
33	A	47.0
34	D	78.3
35	C	87.9
36	A	69.6
37	B	59.1
38	A	72.0
39	D	53.2
40	B	71.1
41	C	68.4
42	D	80.4
43	C	80.6
44	B	60.2
45	A	53.4
46	D	69.5
47	A	68.9
48	D	63.0
49	A	60.5
50	B	54.2
51	C	60.1
52	D	45.0
53	B	71.2
54	A	56.1
55	D	61.0
56	A	58.6
57	C	82.0
58	D	78.8
59	B	51.9
60	C	75.0
61	B	76.2
62	C	54.1
63	B	64.0
64	D	63.4
65	B	73.6
66	C	54.5
67	B	70.4
68	C	76.9
69	D	29.2
70	C	65.0

*Difficulty—percentage of students answering the question correctly

The table at the left shows question-by-question results and the keyed answers. Parallel tables in the school and jurisdiction reports show the percentage of students who selected each alternative. From this table, teachers can determine areas of strength and weakness in the achievement of their students relative to the province as a whole and, consequently, areas of strength and weakness in their programs.

Examiners' Comments

4. The single-sentence paragraphs describing the old woman and the little girls (lines 53 and 66) have MAINLY the effect of

A. conveying their helplessness
B. conveying the narrator's pity
C. emphasizing their physical characteristics
● D. emphasizing the narrator's shock at these revelations

In their analysis of **question 4**, some of the teachers who reviewed the examination during the standard setting session felt that although the question was appropriate, many students would be incorrectly drawn to alternative C. In fact, alternative C did draw 39.8% of all students, whereas the correct response attracted only 33.4%. Evidently, students did not consider carefully enough that the stem was questioning the **effect** that the old woman's blindness and the girls' deafness had on the narrator, and instead they selected the alternative that offered a literal explanation. This inattentiveness was most apparent in the students who failed the examination (achieved 49% or less): 13.2% of them chose the correct response and 53.8% of them chose alternative C. Of the students achieving the acceptable standard who scored between 50% and 64% on the whole examination (parts A and B), 25.3% chose the correct response and 45.0% chose alternative C. Students who achieved the standard of excellence were far more discriminating: 62.4% chose the correct response and 22.6% chose alternative C.

Questions 11 and **17** were two of a set of 11 questions concerning the poem "In Columbus, Ohio."

11. In lines 11 and 12, the speaker reveals his ironic self-awareness in that he

A. worries about his diminishing poetic abilities
B. perceives that the parents are poetic
C. is still resented by the parents
● D. is himself talking of the past

Some of the teachers who reviewed the examination had concerns about **question 11.** They thought that the concept of irony, coupled with the notion of self-awareness, was too challenging for English 33 students. Their concerns were not realized, however, as 60.4% of the students correctly chose alternative D. Of the students who achieved the standard of excellence, 90.1% were able to discern the irony of the speaker commenting on the likelihood of his former girlfriend's parents speaking increasingly of the past when he himself is reflecting on that very thing. Of the students who achieved the acceptable standard by scoring between 50% and 64% on the whole examination, 51.9% chose the correct response.

17. The DOMINANT feeling expressed by the speaker is one of

A. resentment
B. confusion
● C. regret
D. fear

In **question 17**, students were asked to ascertain the prevalent feeling expressed by the speaker. In this poem, the speaker's reflections on his youth lead him to re-evaluate the motivations and behavior of people in his former relationships. Some teachers who reviewed the examination felt that students would have difficulty distinguishing this as a feeling of regret, would instead interpret the speaker's indecision and jumbled thoughts to be a reflection of his feeling of confusion, and would therefore incorrectly choose alternative B. However, students handled this question with relative ease: 72.8% of all students selected the keyed response. Even the students who failed the examination managed quite well on this question, with 51.9% of them selecting the correct response. The alternative "confusion" drew only 7.7% of all students and, interestingly, more students (14.3%) believed that the speaker was expressing a feeling of resentment. It is encouraging to observe the astute understanding English 33 students had of this poem's fairly complex and mature theme.

18. In the character description of Daddy Sherry at the beginning of the excerpt, the phrase "if the sap rising within him does not split the bark" is an example of

A. simile
● B. metaphor
C. hyperbole
D. personification

The results for **question 18** were disappointing, given that the teachers who reviewed the examination felt that the figures of speech being tested were easily accessible to students. The majority of students failed to grasp that the playwright was comparing Daddy Sherry to a tree in the phrase "if the sap rising within him does not split the bark." Many students (31.4% of all respondents) mistakenly identified this reference as an example of personification. Of the students who achieved the standard of excellence, 50% recognized the phrase as an example of metaphor whereas 25.5% labelled it an example of personification. Greater confusion existed in the group who achieved the acceptable standard by scoring between 50% and 64% on this examination: 39.4% correctly chose "metaphor" but 32.8% chose "personification." Of the students who failed the examination, 37.4% chose the correct response and 31.4% inaccurately classified the phrase as an example of personification.

69. In the second stanza, the words "sweeps" (line 15), "whirls" (line 15), and "flame-winged flight" (line 18) convey the man's feeling of

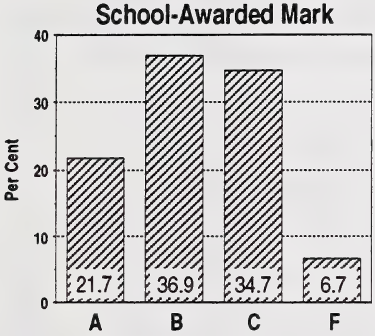
A. achievement
B. contentment
C. expectation
● D. liberation

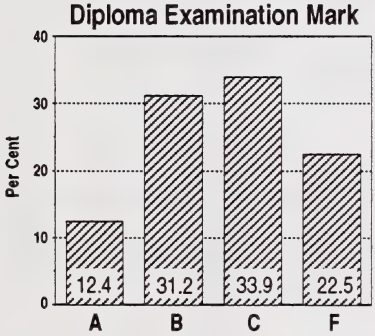
In **question 69**, students were expected to recognize the emotion evoked by the words "sweeps," "whirls," and "flame-winged flight." The majority of students did not appear to recognize the liberating effect that music had on the man. Of all students, 30.8% associated the man's fiddle playing with a sense of achievement and therefore chose alternative A. Many other students (31.5% of all respondents) felt that the man's music elicited a feeling of contentment, and hence chose alternative B. Given the title of the poem, "The Release," and line 11, "he is free," it is surprising that more students did not detect the overwhelming sense of emancipation that pervades the second stanza.

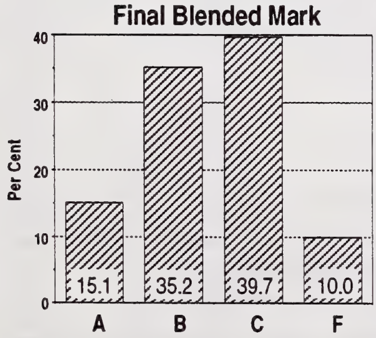
For further information, contact Gloria Malick, Tom Dunn, or Elana Scraba at the Student Evaluation Branch, 427–0010.

Social Studies 30

Diploma Examination Results
Examiners' Report for June 1992







The summary information in this report provides teachers, school administrators, students, and the general public with an overview of results from the June 1992 administration of the Social Studies 30 Diploma Examination. This information is most helpful when used in conjunction with the detailed school and jurisdiction reports that have been mailed to schools and school jurisdiction offices. An annual provincial report containing a detailed analysis of the combined January, June, and August results will be available this fall.

Description of the Examination

The Social Studies 30 Diploma Examination consists of two parts: a multiple-choice section worth 70% and a written-response section worth 30% of the total examination mark.

Achievement of Standards

The information reported is based on the final blended marks achieved by 12 395 students who wrote the June 1992 examination.

- 90.0% of these students achieved the acceptable standard (a final blended mark of 50% or higher).
- 15.1% of these students achieved the standard of excellence (a final blended mark of 80% or higher).

Generally, student achievement in Social Studies 30 was acceptable; however, there was a slight decrease in the proportion of students achieving the acceptable standard (from 92.3% in January 1992 to 90.0% in June 1992). A significant number of students found the written-response section of the examination to be challenging and had difficulty integrating concepts and defining the issues addressed by the assignments.

Provincial Averages

- The average school-awarded mark was 67.4%.
- The average diploma examination mark was 61.6%.
- The average final blended mark, representing an equal weighting of the school-awarded mark and the diploma examination mark, was 64.8%.

Part A: Multiple Choice

Examination Blueprint

Part A: Multiple Choice has a value of 70 marks, one mark for each multiple-choice question. Each question is classified in two ways: according to the curricular content area (topic) being tested and according to the knowledge and skill objectives required to answer the question. The examination blueprint illustrates the distribution of questions in June 1992 according to these classifications.

All questions on the diploma examination require students to demonstrate knowledge of social studies content and to apply social studies skills to that knowledge base. The reporting categories below define the general types of questions that appear on the examination and the categories for which information is reported.

		Question Classification by Topic		**Total Questions**
		Topic A: Political and Economic Systems	**Topic B: Global Interaction in the 20th Century**	
		Knowledge and application of facts, concepts, and generalizations related to the world's political and economic systems as outlined in the *Program of Studies*.	Knowledge and application of facts, concepts, and generalizations related to the interaction of nations since 1918 as outlined in the *Program of Studies*.	
Question Classification by Knowledge and Skill Objectives	**Comprehension of Information and Ideas** These questions require students to demonstrate their knowledge and understanding of generalizations, key concepts, and facts related to social studies content.	1, 2, 3, 4, 5, 13, 14, 19, 22, 23, 24, 32	36, 37, 38, 39, 40, 47, 57, 58, 62, 63, 69, 70	24
	Interpretation and Analysis of Information and Ideas These questions require students to demonstrate their knowledge of social studies content by interpreting and analysing information and ideas.	8, 15, 17, 18, 21, 25, 26, 29, 30, 34, 35	41, 42, 49, 50, 51, 52, 56, 59, 64, 65, 66, 68	23
	Synthesis and Evaluation of Information and Ideas These questions require students to demonstrate and apply their knowledge of social studies content by synthesizing information and ideas and evaluating their accuracy and worth.	6, 7, 9, 10, 11, 12, 16, 20, 27, 28, 31, 33	43, 44, 45, 46, 48, 53, 54, 55, 60, 61, 67	23
	Total Questions	**35**	**35**	**70**

Results

Results are reported in average raw scores. Total Part A: 45.8 out of 70. Subtest results for Part A:*

by Topic

- Political and Economic Systems: 22.7 out of 35
- Global Interaction in the 20th Century: 23.1 out of 35

by Knowledge and Skill Objectives

- Comprehension of Information and Ideas: 16.5 out of 24
- Interpretation and Analysis of Information and Ideas: 15.0 out of 23
- Synthesis and Evaluation of Information and Ideas: 14.3 out of 23

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*Readers are cautioned **not** to compare subtest results because the subtests are not of equal difficulty. Instead, readers should compare these provincial subtest results with their own school results.

Question-by-Question Results

Question	Key	Difficulty*
1	C	67.3
2	C	78.2
3	B	67.8
4	B	43.2
5	B	63.0
6	B	66.1
7	D	88.4
8	C	71.0
9	D	67.9
10	A	68.5
11	D	59.7
12	C	65.9
13	D	82.3
14	A	52.1
15	A	38.7
16	B	51.9
17	C	72.2
18	B	55.6
19	D	76.5
20	C	82.4
21	D	60.5
22	B	57.6
23	A	79.6
24	C	80.1
25	B	47.9
26	A	77.8
27	D	66.4
28	C	68.5
29	A	63.5
30	B	56.9
31	D	37.7
32	C	52.6
33	C	56.1
34	A	82.1
35	B	59.7
36	B	89.3
37	D	81.9
38	A	61.8
39	D	68.6
40	A	61.5
41	B	49.1
42	D	53.9
43	D	52.0
44	A	74.1
45	B	35.7
46	D	72.0
47	C	42.4
48	A	58.5
49	A	62.8
50	D	73.4
51	D	66.3
52	C	63.1
53	A	63.3
54	B	64.3
55	A	43.6
56	D	79.9
57	B	81.8
58	C	83.5
59	C	71.8
60	D	48.2
61	B	65.0
62	C	67.7
63	C	76.7
64	C	78.3
65	B	72.1
66	D	65.9
67	A	72.2
68	A	76.1
69	B	60.6
70	C	74.9

*Difficulty—percentage of students answering the question correctly

The table on the left shows question-by-question results and the keyed answers. Parallel tables appear in the school reports and in the jurisdiction reports. Comparison of school results with provincial results may show areas of strength and weakness in instructional programs.

Examiners' Comments

The multiple-choice section of the examination requires students to go beyond simply recalling information and to apply their knowledge and thinking skills. Students must demonstrate that they understand social studies concepts; that they comprehend historical, political, and economic relationships; and that they can interpret and evaluate social studies information and ideas.

The following table gives results for five questions selected from the examination. For each question, statistics are given for three student groups. The comments on the following pages discuss some of the decisions that students may have made and some of the skills they may have used to answer these questions correctly.

Percentage of Students Correctly Answering Selected Multiple-Choice Questions

	Question Number				
Student Group	**25**	**26**	**48**	**51**	**52**
All students	47.9	77.8	58.5	66.3	63.1
Students achieving the standard of excellence (80% or higher, or A) on the whole examination	86.3	98.8	84.5	97.1	88.8
Students achieving the acceptable standard who received marks between 50% and 64%, or C, on the whole examination	35.8	76.7	53.5	59.9	58.5

In questions 25 and 26, a certain condition or policy is stated in relation to two groups. Judge the effect of the condition or policy on the groups listed by answering

- **A.** if the policy is acceptable to the first group but unacceptable to the second
- **B.** if the policy is unacceptable to the first group but acceptable to the second
- **C.** if the policy is acceptable to both groups
- **D.** if the policy is unacceptable to both groups

POLICY	GROUPS INVOLVED
25. The abolition of private property	• German Nazi Party, 1933 • Russian Bolsheviks, 1918 **(Key B)**
26. Transfer payments to redistribute income	• Social Democrats • Laissez-faire Economists **(Key A)**

Questions 25 and **26** required students to evaluate and judge the acceptability of a certain policy to a pair of selected groups. Students had to recognize the different points of view represented by these groups and predict their reaction to each policy. The skills required by these questions include knowledge of historical and current ideologies, and analysis and evaluation of the relationships between economic policies and differing political/economic perspectives.

Many students found **question 25** to be difficult: 52% chose incorrect responses. The fact that 30% of all students who answered the question (36% of those achieving the acceptable standard with marks between 50% and 64%) concluded that the abolition of private property was acceptable to both groups suggests that many students are confused about the nature of the economic program of the German Nazi Party.

Question 26 was not difficult. Most students were able to determine the correct response of two ideologically different groups to a specific government policy.

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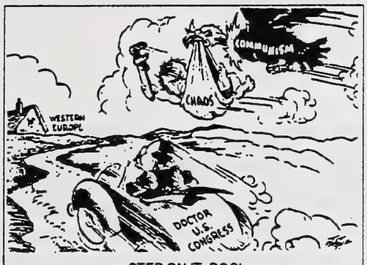
48. *I love Germany so much; I'm glad there are two of them.*

In this statement, made soon after the Second World War by a French commentator, the word "love" could be replaced by which of the following words and still retain the same meaning?

● A. Fear
B. Admire
C. Support
D. Appreciate

Question 48 tested students' ability to discern from a statement the subtle irony of an important historical generalization—that a nation divided is weakened and poses less of a threat to its neighbors—and apply this understanding to France's traditional "fear" of a united and strong Germany. Students found the question somewhat difficult, with 42% choosing incorrect responses. They perhaps focused too narrowly on the quotation itself rather than on the commonly held, historical French attitude toward the prospect of a unified Germany. However, 84.5% of the students achieving the **standard of excellence** answered correctly and therefore understood the connection between the irony in the quote and the French attitude at the time.

Use the following cartoon to answer questions 51 and 52.



STEP ON IT, DOC!

—Justus, *The Minneapolis Star*

51. This cartoon was drawn in response to events in Western Europe
    - A. upon the signing of the Munich Accord
    - B. upon the signing of the Treaty of Versailles
    - C. immediately before the outbreak of the Second World War
    - ● D. immediately after the conclusion of the Second World War

52. The message in the cartoon suggests a distinct bias
    - A. opposed to self-determination in liberated Europe
    - B. opposed to the formation of the NATO alliance
    - ● C. in favor of the implementation of the American Marshall Plan
    - D. in favor of an American isolationist foreign policy

Questions 51 and **52** were based on a cartoon from the beginning of the Cold War period. Students needed to use critical thinking skills including interpretation, synthesis, and detecting bias, as well as to recall relevant historical events to infer the message portrayed in the cartoon.

Question 51 required students to recognize the meaning and significance of various symbolic representations in the cartoon and to place them into an appropriate historical time period. Many students correctly identified the time frame of the cartoon: in fact, 97.1% of the students achieving the **standard of excellence** answered correctly, as did 59.9% of the students whose examination scores were between 50% and 64%.

Question 52 required students to recognize the position taken in the cartoon and associate it with a bias for or against American involvement in Western Europe following the Second World War. Students first had to establish the context for the actions shown and then determine whether a particular policy was favored or opposed. The fact that 63.1% of all students and 88.8% of those achieving the **standard of excellence** answered correctly indicates that many students used their critical thinking skills to identify the correct answer.

Part B: Written Response

The results for the written-response section of the Social Studies 30 Diploma Examination are tabulated according to the percentage of students achieving at each level (1 to 5) in each of the scoring categories. Each scoring category assesses somewhat different skills; consequently, individual student's scores are likely to vary from one category to another. Those students who achieve at or above the **standard of excellence** (80%) on the written-response section have scores of **(4) Proficient** or **(5) Excellent** for all scoring categories. Students just meeting the acceptable standard (50%) on the written-response section have scores of **(3) Satisfactory** for some scoring categories but produce **(2) Limited** work for others. Students who produce **(3) Satisfactory** work for all scoring categories receive scores of 18 out of 30 on Part B.

Readers will find the results most meaningful in the context of the assignment and the scoring descriptors. The most useful starting place for reviewing these results is at the **(3) Satisfactory** level. The scoring guides that describe proficiency levels are in the *Diploma Examinations Program Update, Social Studies 30, 1991-92 School Year.*

Examination Blueprint and Percentage Distribution of Scores

The written-response section contributes 30% of the total examination mark. Students are required to write one complete and unified essay in which they define the scope of an issue and rationally defend their position by using supportive, relevant evidence. The organization of arguments should show evidence of logical thought that should persuade the reader. Students are expected to make use of their critical and creative thinking skills to demonstrate complex and independent thought.

Part B: Written Response has a total value of 30 marks: 10 marks each for *Defence of Position* and *Presentation of Examples* and five marks each for *Definition of the Issue* and *Quality of Language and Expression.*

Scoring Category	**Proportion of Total Mark (%)**	**Percentage Distribution of Scores**					
		(5) Excellent	**(4) Proficient**	**(3) Satisfactory**	**(2) Limited**	**(1) Poor**	**Ins***
1. Definition of the Issue	5	1.4	10.6	35.4	41.0	10.6	0.8
2. Defence of Position	10	1.9	12.5	37.6	39.0	8.1	0.8
3. Presentation of Examples	10	2.4	12.4	34.5	36.5	13.4	0.8
4. Quality of Language and Expression	5	2.2	17.8	60.9	16.9	1.4	0.8

***Ins** (Insufficient) is a special category that includes students who did not attempt the assignment, who wrote too little to evaluate, or who wrote answers that were completely off topic.

Note: The shaded portion represents the percentage of students who achieved or exceeded a **(3) Satisfactory** level of performance.

Examiners' Comments

Scores for the written component of the June 1992 examination were lower compared with recent administrations (January 1991 to January 1992). Both essay topics were clearly challenging for student writers. Many markers, including teachers who confirmed standards, felt that many students exhibited considerable conceptual confusion in dealing with the issues under discussion. Sometimes this confusion appeared as oversimplification of the issue under discussion. Many students appeared to rely on memorized terms that they considered, inappropriately, to indicate underlying assumptions that were polar opposites ("interventionism" and "individualism," for example). At other times, conceptual confusion appeared as misunderstanding the elements being discussed; for example, viewing socialism as being "ideologically neutral."

Topic A

Many individuals believe that government leaders should implement domestic economic programs that reflect their own specific ideological beliefs. Other individuals argue that government leaders should implement domestic economic programs that are based on the requirements of the prevailing economic situation. Still others believe that government leaders, in implementing domestic economic programs, should combine their specific ideological beliefs with the requirements of the prevailing economic situation.

In implementing domestic economic programs, should government leaders be motivated primarily by their own specific ideological beliefs?

In an essay, choose and defend a position on this issue.

Topic B

During the 20th century, many groups of people sharing common national aspirations have peacefully achieved self-determination. Other groups of people have achieved national sovereignty through conflict, at great cost and suffering. Still other groups, sharing common national aspirations, continue to strive to attain national independence and international recognition.

Does the quest for national sovereignty contribute to global stability?

In an essay, choose and defend a position on this issue.

This observation, however, was offset by the comment that students presented an impressive range of approaches to both topics, particularly those students who are more sophisticated writers. The writing of these students was often creative, fluent, and interesting to read, and their argumentation and supportive evidence were not contrived or forced. These writers achieving at the excellent and proficient levels appropriately integrated key social studies concepts and relevant historical or current events into the fabric of their writing, often in unique and effective ways.

Students falling short of satisfactory writing demonstrated difficulty in defining the nature of the disagreements raised by the issues. A problem common to the writing on both topics was the inability of many students writing below the satisfactory level to identify appropriate underlying assumptions, principles, or beliefs. When dealing with Topic A, for example, many of these students suggested that the economic programs implemented by government leaders were ideologically rooted but the economic programs favored by their citizens (often completely opposite in nature) were somehow free of ideological influence. Some students described market-oriented programs as ideologically neutral whereas those of a socialist bent were not, or vice versa. Similarly, when dealing with Topic B, students writing below the satisfactory level often equated the concept of national sovereignty with acts of imperialist aggression or the protection of national security on the part of established nations such as Nazi Germany. These students chose to avoid, or did not understand, the consequences to world stability arising from the search for, or achievement of, self-determination or national sovereignty by people sharing common national aspirations. This was the focus of the assignment as presented in the preamble. With such conceptual confusion at the outset about the nature of the issues, further effort often dissolved into much convoluted writing.

Writers achieving at the excellent or proficient level did grasp the meaning of these concepts, often adeptly explaining the connections between ideological belief and the development of economic programs, or the impact on global stability of the quest for national sovereignty. In other words, these students had learned the concept as well as the terminology. Their perceptions included a competent sense of applying a concept to a particular context, its relationship to other concepts, and something of its level of abstraction. It is noteworthy as well that many markers, including those teachers who confirmed standards, commented on the fact that many students achieving at the satisfactory level or higher began their essays with some trepidation but gained in confidence and strength as their writing progressed. This development reinforces the importance of planning before constructing a response.

It was encouraging to see excellent and proficient writers demonstrate an awareness that a strong argumentative paper is developed through the application of relevant historical and contemporary evidence—evidence that in many instances supports a qualified rather than an unequivocal position. In dealing with Topic A, many students achieving at these levels adroitly integrated evidence into their essays from historical examples such as Lenin's New Economic Policy and President Roosevelt's New Deal. In dealing with Topic B, writers at these levels incorporated into their essays historical examples of the establishment of the state of Israel, the redrawing of the European map following the First World War, and independence movements occurring in Africa and Asia after the Second World War. Although current examples are not a requirement, it was surprising and somewhat disappointing that many students, particularly those achieving below the satisfactory level, did not take advantage of the ample current evidence arising from the momentous ideological shifts occurring in Eastern Europe and the former Soviet Union, nor did many cite the ongoing horrors of nationalist fervor in the Balkans, and the peril this development may hold for the world.

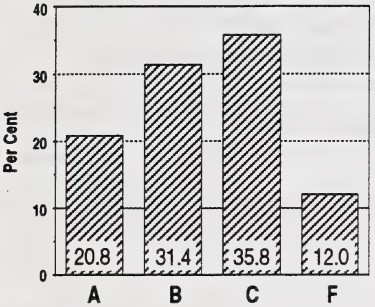
Students achieving below the satisfactory level often did not link their examples in a meaningful way to their positions. They developed evidence primarily in descriptive terms and showed little insight into its applicability. As one marker claimed, "Too many students simply start writing and put down words." For example, rather than considering the results of a rigorous application of the ideological foundations of capitalism by certain government leaders, such writers chose instead to describe in great detail the characteristics of a market economy. Superficial descriptions of detail and the presentation of extraneous information resulted in lower scores.

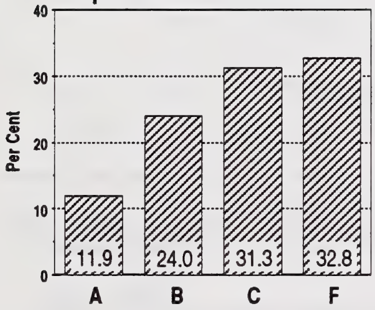
Given the constraints of examination conditions, it is a source of continuing encouragement to see many students develop longer but powerful and well-written responses. Overall, however, it was apparent that the demands of the June 1992 assignments were beyond the comprehension of many students. Writers achieving below the satisfactory level often rushed headlong into a discourse without taking enough time to think about the depth of the issue and about the relevance of historical or current examples.

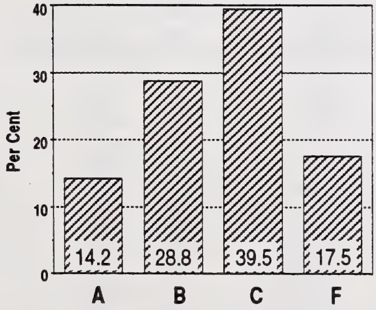
For further information, contact Barry Jonas, Tom Dunn, or Elana Scraba at the Student Evaluation Branch, 427-0010.

Mathematics 30

Diploma Examination Results
Examiners' Report for June 1992


School-Awarded Mark


Diploma Examination Mark


Final Blended Mark

The summary information in this report provides teachers, school administrators, students, and the general public with an overview of results from the June 1992 administration of the Mathematics 30 Diploma Examination. This information is most helpful when used in conjunction with the detailed school and jurisdiction reports that have been mailed to schools and school jurisdiction offices. An annual provincial report containing a detailed analysis of the combined January, June, and August results will be available this fall.

Description of the Examination

The Mathematics 30 Diploma Examination consists of three parts: a multiple-choice section of 40 questions worth 60%, a numerical-response section of 7 questions worth 10%, and a written-response section of 4 questions worth 30% of the total examination mark.

Achievement of Standards

The information reported is based on the final blended marks achieved by 10 749 students who wrote the June 1992 examination.

- 82.5% of these students achieved the acceptable standard (a final blended mark of 50% or higher).
- 14.2% of these students achieved the standard of excellence (a final blended mark of 80% or higher).

For the fourth year in a row, approximately 30% of the students who wrote the examination failed to achieve the acceptable standard. Students continue to have difficulty applying their knowledge of math in new contexts.

We continue to be concerned that a high number of students fail to meet the acceptable standard set by the examination whereas a comparatively low number of students fail to achieve 50% or higher on their school-awarded mark. This discrepancy suggests that provincial standards are not being consistently applied in classrooms throughout Alberta. Provincial standards for Mathematics 30 are explicitly set out in the *Mathematics 30 Diploma Examination Bulletin.*

Provincial Averages

- The average school-awarded mark was 65.7%.
- The average diploma examination mark was 57.8%.
- The average final blended mark, representing an equal weighting of the school-awarded mark and the diploma examination mark, was 62.1%.

Results and Examiners' Comments

Subtest

When analyzing detailed examination results, please bear in mind that subtest results **cannot** be directly compared.

Results are in average raw scores.

Machine scored: 28.5 out of 46

Written response: 9.5 out of 20

Course Content

- Polynomial Functions: 4.3 out of 8
- Trigonometric and Circular Functions: 8.1 out of 13
- Statistics: 7.5 out of 13
- Quadratic Relations: 3.6 out of 8
- Exponential and Logarithmic Functions: 5.1 out of 8
- Permutations and Combinations: 4.1 out of 7
- Sequences and Series: 5.4 out of 9

Cognitive Levels

- Knowledge: 3.6 out of 5
- Comprehension: 9.3 out of 15
- Application: 21.6 out of 39
- Higher Mental Activities: 3.6 out of 7

Examination Blueprint

Each question on the examination is classified in two ways: according to the curricular content area being tested and according to the cognitive level demanded by the question. The examination blueprint illustrates the distribution of questions in June 1992 according to these classifications. Numbers in brackets [ ] indicate written-response questions, those in parentheses ( ) indicate numerical-response questions, and those without brackets or parentheses are multiple-choice questions.

	Questions by Cognitive Level				
Reporting Category	**Knowledge**	**Comprehension**	**Application**	**Higher Mental Activities**	**Examination Emphasis (%)**
Polynomial Functions		1	(1); [4]	2	12
Trigonometric and Circular Functions	3	4, 7; (2)	5, 6, 8; [1]	9	19.5
Statistics	15	16; (3)	10, 11, 12, 14; [3]	13	19.5
Quadratic Relations	18	(4)	[2]	17	12
Exponential and Logarithmic Functions	19	20, 21, 22	23, 24; (5)	25	12
Permutations and Combinations		26, 28, 32; (6)*	27, 30, 31	29	12
Sequences and Series	33	34, 38	35,36, 37, 39; (7)	40	13
Examination Emphasis (%)	7	22	60	11	100

*Numerical-response question 6 was deleted because ambiguous wording led students to incorrect strategies and hence incorrect answers.

This examination has a balance of question types and difficulties. It is designed so that students capable of achieving the acceptable standard will obtain a mark of 50% or higher and students capable of achieving the standard of excellence will obtain a mark of 80% or higher.

Multiple Choice

For a complete breakdown of student responses by alternative for the multiple-choice questions, please refer to the school and jurisdiction reports.

Students who enrol in Mathematics 30 are expected to be able to meet the acceptable standard. The standards set by the examination require students to successfully complete most of the knowledge, comprehension, and application questions. However, too many students are not successfully answering such questions. An illustrative question follows.

Question	Key	Difficulty*	Question	Key	Difficulty*
1	A	78.3	21	D	79.1
2	B	58.5	22	D	70.2
3	A	87.2	23	C	65.5
4	A	70.5	24	D	56.5
5	D	71.7	25	B	66.3
6	C	69.8	26	C	82.1
7	B	57.5	27	B	59.1
8	C	70.4	28	B	65.2
9	D	58.8	29	B	34.5
10	B	67.3	30	C	77.1
11	C	45.5	31	A	49.3
12	D	50.5	32	D	43.0
13	D	36.0	33	C	63.2
14	C	86.4	34	C	44.4
15	D	92.1	35	D	70.3
16	A	75.2	36	A	79.0
17	B	70.9	37	B	82.4
18	B	77.9	38	A	69.8
19	A	42.5	39	B	62.1
20	A	81.9	40	A	36.4

*Difficulty—percentage of students answering the question correctly

40. A culture of bacteria is being studied in a genetics experiment. The researcher observes that the bacteria double in number every 15 min. After 8 h, the number of bacteria in the culture is *N*. At this rate, how long will it take for the total population of bacteria to reach 16*N*?

● A. 9 h
B. $9\frac{1}{4}$ h
C. 16 h
D. 128 h

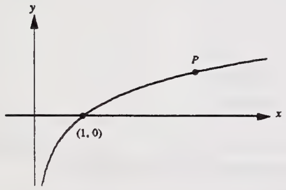
Question 40 reinforces the notion that students should check an answer to ensure that it is reasonable. This question required students to recognize that bacteria doubling is an example of exponential growth or a geometric sequence with a common ratio of 2. Approximately 31% of the students who wrote the examination interpreted this doubling as a linear function and chose alternative D. If students had examined the reasonableness of this solution, they would have discovered that after 128 h there would be an incredibly large number of bacteria. An almost equal number of students, 36.4%, recognized the doubling process as a geometric sequence and therefore chose the correct alternative.

Numerical Response

Question	Key	Difficulty*
1	11.0	58.5
2	3.8	49.2
3	5.3	39.0
4	5.0	21.9
5	2.91	47.2
6	—	—
7	8.4	33.0

*Difficulty—percentage of students answering the question correctly

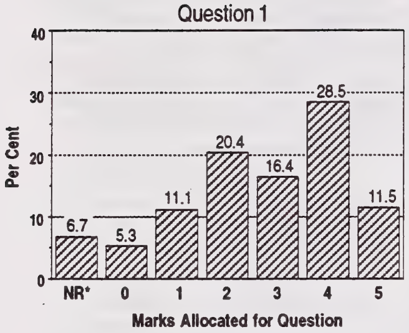
5. The sketch of the graph of $y = \log_2(x)$ is shown below. If $P(x, 1.54)$ is a point on this graph, then the value of *x* correct to the nearest hundredth is ____________.



Question 5 required students to use their knowledge of logarithmic equations to determine the value of *x* in the equation $y = \log_2(x)$, given the value of *y*. Students were provided with the graph of $y = \log_2(x)$ to illustrate the relationship between solving a logarithmic equation and a point on the graph. We expect that students who achieve the acceptable standard can solve simple exponential and logarithmic equations and can use the graphs of logarithmic functions to estimate the value of one of the variables, given the other variable. Only 42.8% of all students who met the acceptable standard were able to solve this logarithmic equation. Of those students who met the standard of excellence, 82.7% were able to complete this question correctly.

Written Response

Questions in the written-response section dealt with four of the seven content strands for Mathematics 30. Students performing at the acceptable standard were expected to obtain at least half marks on all questions. Students performing at the standard of excellence were expected to answer all questions almost perfectly. We were very pleased that 83.8% of students attempted all the written-response questions. Having attempted the questions, most students were able to receive some marks. Only 12.0% of all students received no marks for question 1, 22.6% received no marks for question 2, only 10.5% received no marks for question 3, and only 13.1% received no marks for question 4.



*NR—No Response

Question 1 required students to describe the effects of the parameters *a, c,* and *d* on the graph of $y = \sin\theta$. To describe these effects, students used a variety of methods: paragraph form, point form, and diagrams. All these methods were acceptable. We expected that students who met the acceptable standard would be able to describe the effects of each parameter on the graph. Students who were able to do this received 4 out of the 5 marks. Of the students who achieved the acceptable standard but not the standard of excellence, 33.1% met the expectation for this question. Those students who achieved the standard of excellence were expected to discuss not only the effects of each parameter but also the effects of these parameters on the domain or range of the function. Of the students who achieved the standard of excellence, only 34.1% met the expectation for this question.

On this 5-mark question, the average mark was 2.73 or 54.6%.

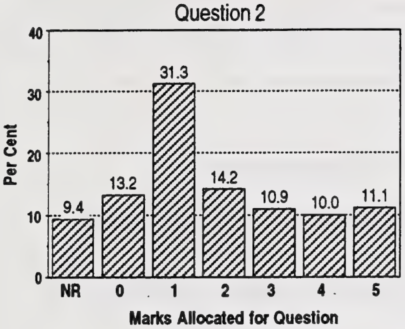
Scoring Question 1: To receive 6 check marks, students needed to describe the parameter, either explicitly or implicitly, and then its effect on the graph of $y = \sin\theta$. To receive 7 or 8 check marks, students needed to discuss the overall effect of all three parameters.

Checks	Marks
7 or 8	5
6	4
5	3
3 or 4	2
1 or 2	1

One example of a response that would receive 5 marks is:

> The parameter $\frac{1}{2}$ is the amplitude for the graph. The amplitude changes from 1 to $\frac{1}{2}$. The parameter $+\frac{\pi}{4}$ moves the graph of $y = \sin\theta$ left $\frac{\pi}{4}$ units. The parameter -2 moves the graph down 2 units. These three parameters change the range of $y = \sin\theta$ from $-1 \quad y \quad 1$ to $-\frac{5}{2} \quad y \quad -\frac{3}{2}$.

Note: In scoring this question, markers found that students had a difficult time expressing their ideas. They misused phrases and terms such as "altitude" for "amplitude;" they said that the curve became "flatter," that the graph moved "left $-\frac{\pi}{4}$ units" or "2 translations" down, and that "–2 changes the *x*-axis. The *x*-axis is now at –2." Students need to continue to practise writing *about* mathematics.



Question 2 required students to solve a problem using their knowledge of quadratic relations. The question postulated that two people had started to graph a conic. Students needed to analyze the information provided, identify unknown information, decide on a strategy to solve the problem, and carry through to complete the graph of the conic. One way of solving this problem was to identify the eccentricity of the conic, determine that the conic was a hyperbola, and then draw a hyperbola. Students who achieved the acceptable standard were expected to identify the eccentricity, determine the conic, and then draw at least one branch of the hyperbola. Only 35.3% of these students met or exceeded this expectation. Students who achieved the standard of excellence were expected to realize that a hyperbola has two branches and to draw the two branches. In fact, 73.1% of these students did recognize that a hyperbola has two branches. However, 25.9% of the students who met the standard of excellence misinterpreted the directrix to be the axis of symmetry.

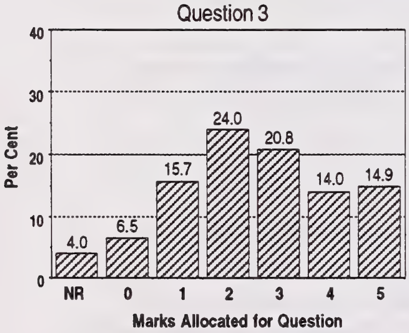
On this 5-mark question, the average mark was 1.88 or 37.6%.

Scoring Question 2: A scoring guide was used to score question 2. Markers reviewed each student's response and matched the response to the criteria.

Scoring Guide for Written-Response Question 2

Score	Criteria
5 marks	**Identifies a strategy, carries it through to arrive at a solution to the problem, and then confirms that the solution is consistent and correct throughout by:** calculating eccentricity = 2; stating that the conic is a hyperbola; drawing both branches of the hyperbola correctly ***or*** stating that the conic is a hyperbola; explaining why a hyperbola was chosen; drawing both branches of the hyperbola correctly
4 marks	**Identifies a strategy, carries it through to arrive at a solution to the problem, and then confirms that the solution is consistent throughout by:** calculating eccentricity = 2; stating that the conic is a hyperbola; attempting to draw two branches of the hyperbola and drawing only one branch correctly ***or*** calculating eccentricity = 2; stating that the conic is half a hyperbola; drawing one branch correctly ***or*** stating that the conic is a hyperbola; explaining why a hyperbola was chosen; drawing two branches but only one branch correctly

3 marks	**Identifies a strategy and carries it through to arrive at a solution to the problem by:** calculating eccentricity = 2; stating that the conic is a hyperbola; drawing only one branch of the hyperbola correctly ***or*** completing the graph of the hyperbola correctly with no explanations ***or*** attempting to calculate eccentricity = 2; stating the corresponding conic; attempting to draw the corresponding conic
2 marks	**Identifies a strategy and begins to carry it through to begin the solution to the problem by:** calculating eccentricity = 2; stating an incorrect conic (for example, parabola); drawing one branch of the hyperbola correctly ***or*** stating some value for the eccentricity; stating the corresponding conic ***or*** calculating eccentricity = 2; drawing one branch of the hyperbola correctly ***or*** drawing two branches of the hyperbola, only one correctly, with no explanation
1 mark	**Identifies a strategy to solving the problem by:** stating that a hyperbola is being drawn ***or*** drawing a reasonable representation of one branch of a hyperbola ***or*** calculating eccentricity



Question 3, part a, required students to determine a 90% confidence interval for the percentage of yeses in a population, given the number of yeses in a sample. Part b required students to describe the significance of the 90% confidence interval from part a. Part c asked how the confidence interval would change if the sample size increased. Students who achieved the acceptable standard were expected to successfully complete parts a and b and to begin a description in part c. In fact, 56.7% of the students who achieved the acceptable standard but not the standard of excellence met or exceeded this expectation. Students who achieved the standard of excellence were expected to score at least 4 out of 5 marks on this question, that is, to successfully complete parts a, b, and c. Of the students who achieved the standard of excellence, 69% met this expectation. Markers felt that students need to be given more opportunity to discuss the meaning of confidence intervals. Students need to realize that a confidence interval is obtained after several surveys are conducted: if a survey is replicated 100 times, you can expect similar results 90 times; however, results will be different 10 times. Many students interpreted the confidence interval to mean that 30 to 50 people are expected to respond "yes." (For additional information about how students misunderstood confidence interval, refer to

"Directions for the 1993 Examinations" in the *Mathematics 30 Diploma Examination Bulletin, 1992-93 School Year.*)

On this 5-mark question, the average mark was 2.57 or 51.4%.

Scoring Question 3: Part a was worth 1 mark. Students were awarded the mark for part a if they indicated that the 90% confidence interval was 30–50% ***or*** 40% ± 10%. Students were also awarded the mark if they extrapolated the interval from the 90% Box Plots to arrive at a symmetric interval about 40% where the lower limit was greater than 25% and the upper limit was less than 55%.

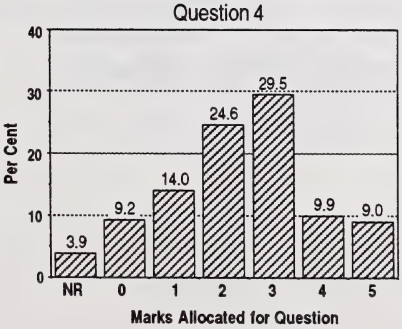
Part b was worth 3 marks, which were determined as follows:

Score	**Criteria**
3 marks	Student's response indicates that a level of certainty or uncertainty exists and that the proportion of yeses in the population will be within the confidence interval identified in part a; the response clearly communicates these two criteria.
2 marks	Student's response indicates that a level of certainty or uncertainty exists and that the proportion of yeses in the population will be within the confidence interval identified in part a; the response does not clearly communicate these two criteria.
1 mark	Student's response indicates a level of certainty or uncertainty ***or*** that the proportion of yeses in the population will be within the confidence interval identified in part a.

One example of a response that would receive 3 marks is:

> We are 90% confident that between 30–50% of the population of bus commuters would respond "yes" if they were asked whether or not their bus service was adequate.

Part c was worth 1 mark. Students were awarded the mark if their response indicated that the confidence interval would become shorter or that the margin of error would decrease if the sample size increased.



Question 4 required students to use their knowledge and understanding of polynomial functions to analyze the graph provided. Students who met the acceptable standard were expected to correctly identify the zeros of the polynomial function and the lowest possible degree of this polynomial. Of the students who achieved the acceptable standard but not the standard of excellence, 57% met or surpassed this expectation. Students who achieved the standard of excellence were expected to complete part c of the question by identifying other possible degrees for the

polynomial and explaining their answer. Only 59.5% of the students who achieved the standard of excellence scored at least 4 out of 5 marks on this question.

On this 5-mark question, the average mark was 2.36 or 47.2%.

Scoring Question 4

Part a was worth 2 marks, which were determined as follows:

Score	**Criteria**
2 marks	Student's response indicates that the zeros of the polynomial are –5, 0, 4 ***or*** –5, –5, 0, 4.
1 mark	Student attempts a solution to the problem by writing the solution as factors $x(x + 5)^2(x - 4)$ ***or*** by listing 3 distinct factors: x, $(x + 5)$, and $(x - 4)$ ***or*** by identifying 2 distinct zeros such as –5 and 4.

Part b was worth 1 mark. Students were awarded the mark if they identified the lowest possible degree of the polynomial as being 4.

Part c was worth 2 marks, which were determined as follows:

Score	**Criteria**
2 marks	Student's response clearly indicates other possible degrees (6, 8, . . . or any even degree larger than 4) for the polynomial and explains the reasoning for selecting that number of degrees.
1 mark	Student's response indicates other possible degrees for the polynomial or explains why there are other possible degrees for this polynomial.

One example of a response that would receive 2 marks is:

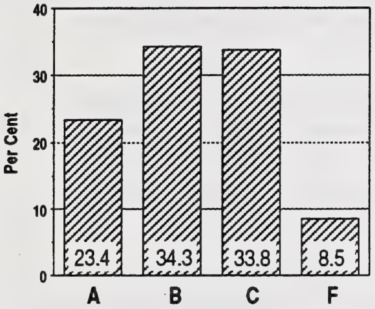
> This polynomial could be degree 6, 8, 10, 12 . . . . A polynomial function that could describe this graph is $P(x) = ax(x - 4)(x + 5)^2$. The factor that can have a higher degree without changing the shape of the graph is $(x + 5)^2$. This factor could have degree 4, 6, 8 . . . . As long as this factor has an even degree, the graph will continue to "touch" the x-axis at –5. If this factor has a higher even degree, the polynomial $P(x)$ will also have a higher even degree.

For further information, contact Florence Glanfield, Lowell Hackman, or Phill Campbell at the Student Evaluation Branch, 427–0010.

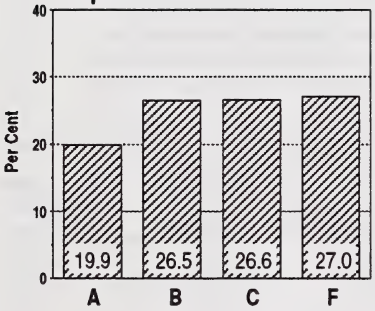
Biology 30

Diploma Examination Results
Examiners' Report for June 1992

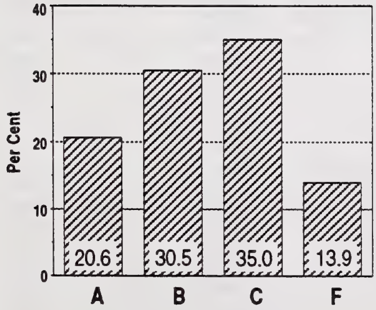
School-Awarded Mark



Diploma Examination Mark



Final Blended Mark



The summary information in this report provides teachers, school administrators, students, and the general public with an overview of results from the June 1992 administration of the Biology 30 Diploma Examination. This information is most helpful when used in conjunction with the detailed school and jurisdiction reports that have been mailed to schools and school jurisdiction offices. An annual provincial report containing a detailed analysis of the combined January, June, and August results will be available this fall.

Description of the Examination

The Biology 30 Diploma Examination consists of two parts: a multiple-choice section of 70 questions worth 70% and a written-response section of five questions worth 30% of the total examination mark.

Achievement of Standards

The information reported is based on the final blended marks achieved by 11 470 students who wrote the June 1992 examination. This represents an increase of about 400 students compared to June 1991.

- 86.1% of these students achieved the acceptable standard (a final blended mark of 50% or higher).
- 20.6% of these students achieved the standard of excellence (a final blended mark of 80% or higher).

Generally, student achievement in Biology 30 for the second semester of 1991–92 was similar to that for the first semester. There was, however, a small decrease (from 88.5 to 86.1) in the percentage of students who achieved the acceptable standard. Many students demonstrated a good understanding of the nature of scientific inquiry; however, a significant number of them had difficulty expressing concepts in the written-response section.

Provincial Averages

- The average school-awarded mark was 67.5%.
- The average diploma examination mark was 62.1%.
- The average final blended mark, representing an equal weighting of the school-awarded mark and the diploma examination mark, was 65.2%.

Results and Examiners' Comments

This examination has a balance of question types and difficulties. It is designed so that students capable of achieving the acceptable standard will obtain a mark of 50% or higher and students capable of achieving the standard of excellence will obtain a mark of 80% or higher. This examination is similar in structure to the January 1992 Biology 30 examination in that it contains five written-response questions, for a total of 30 marks. The maximum value of any one written-response question is 10 marks. The five questions require students to use a variety of thinking skills, all of which go beyond, but are not isolated from, the ability to recall core concepts.

Approximately 12.3% of the students who wrote the examination in June 1992 and received a blended mark had written at least one other Biology 30 Diploma Examination during the January 1991 to January 1992 period. This subpopulation (1 406) achieved an examination average of 59.0%, compared to 62.9% for the population (10 064) whose first writing of a Biology 30 examination was in June 1992. However, the group of students who rewrote increased their examination average score from 47.6% to 59.0%.

Approximately 58.2% of the students who wrote the examination were female. About 71.2% of this female population achieved the acceptable standard on the examination, compared to 75.7% of the male population.

Subtest

When analyzing detailed examination results, please bear in mind that subtest results **cannot** be directly compared.

Results are in average raw scores.

Machine scored: 46.6 out of 70

Written response: 15.4 out of 30

Course Content

- Cellular Processes: 5.4 out of 9
- Homeostatic Mechanisms: 2.9 out of 4
- Nutrition and Digestion: 7.2 out of 11
- Body Fluids: 11.0 out of 18
- Breathing, Gas Exchange, and Transport: 4.6 out of 7
- Energy Release: 3.6 out of 5
- The Kidney: 5.6 out of 10
- Regulation of the Internal Environment: 12.6 out of 22
- Voluntary Movement and Body Support: 3.0 out of 4
- Human Reproduction: 6.3 out of 10

Process Skills: 16.5 out of 26

- Multiple-choice questions 3, 5, 6, 12, 15, 16, 17, 20, 23, 32, 35, 40, 44, 47, 48, and 59; and written-response question 1

Cognitive Levels

- Knowledge: 16.2 out of 25
- Comprehension and Application: 33.6 out of 55
- Higher Mental Activities: 12.2 out of 20

Examination Blueprint

Each question on the examination is classified in two ways: according to the curricular content area being tested and according to the cognitive level demanded by the question. The examination blueprint illustrates the distribution of questions in June 1992 according to these classifications. Numbers with brackets [ ] indicate written-response questions and those without brackets are multiple-choice questions.

	Questions by Cognitive Level			
Reporting Category	**Knowledge**	**Comprehension and Application**	**Higher Mental Activities**	**Examination Emphasis (%)**
Cellular Processes	1, 4	2, 3; [2]	5	9
Homeostatic Mechanisms	7	6, 11, 12		4
Nutrition and Digestion	8, 9, 10, 13	14, 15, 16, 18, 19	17, 20	11
Body Fluids	21, 22, 25	23, 24, 26, 27, 28	[1] *	18
Breathing, Gas Exchange, and Transport	29, 30, 31	33, 34	32, 35	7
Energy Release	36, 37	38, 39	40	5
The Kidney	41, 42	43, 44; [5]		10
Regulation of the Internal Environment	49, 51, 54	45, 46, 50, 52, 53, 55, 56; [3], [4]	47, 48	22
Voluntary Movement and Body Support	57	58, 60	59	4
Human Reproduction	61, 65, 66, 69	62, 63, 64, 67, 68	70	10
Examination Emphasis (%)	25	55	20	100

*Written-response question 1 includes concepts from Nutrition and Digestion but is reported only under Body Fluids.

Multiple Choice

Question	Key	Difficulty*
1	C	82.0
2	D	69.4
3	A	83.9
4	D	67.2
5	C	61.5
6	A	59.8
7	B	76.0
8	B	62.1
9	B	72.5
10	C	83.5
11	A	76.7
12	C	77.3
13	D	61.7
14	C	69.0
15	D	66.5
16	C	68.9
17	A	40.8
18	D	76.8
19	A	45.7
20	A	68.6
21	D	73.3
22	B	45.0
23	C	54.5
24	A	72.8
25	D	65.7
26	B	60.4
27	B	73.6
28	C	52.4
29	B	75.2
30	A	70.3
31	A	56.9
32	B	63.6
33	D	72.6
34	A	61.7
35	A	56.7
36	B	70.8
37	D	57.0
38	C	84.4
39	D	61.7
40	A	81.5
41	A	78.2
42	B	60.5
43	C	81.2
44	A	67.3
45	B	82.6
46	A	75.9
47	D	67.7
48	C	44.3
49	A	38.2
50	B	70.1
51	A	60.8
52	D	61.6
53	C	76.2
54	C	58.8
55	D	60.8
56	A	71.2
57	B	58.6
58	C	70.3
59	B	83.0
60	A	82.9
61	C	63.5
62	D	77.1
63	C	64.1
64	A	70.1
65	A	68.7
66	B	61.3
67	C	71.8
68	A	56.3
69	C	49.0
70	D	50.1

*Difficulty—percentage of students answering the question correctly

Multiple Choice

For a complete breakdown of student responses by alternative for the multiple-choice questions, please refer to the school and jurisdiction reports.

Most students who achieved the acceptable standard demonstrated an understanding of biological concepts by selecting the correct functional description of a human body structure (questions 13, 27, and 62). They also made functional comparisons among body components (questions 6, 41, and 63). Most of these students correctly interpreted simple laboratory tests (questions 11, 12, 15, and 16) and data presented in simple graphs (questions 5, 20, and 44). They sequentially ordered the major steps of physiological processes (questions 30, 43, and 68). They related physiological concepts to common everyday experiences (questions 14, 46, and 50).

Students who achieved the standard of excellence, in addition to fulfilling the expectations identified above, demonstrated the ability to interpret interrelated sets of data presented in complex tables or graphs (questions 17, 23, 35, and 70). They analyzed experimental designs (question 19) and multistep human physiological problems (question 28). They formed correct inferences from extracurricular data (question 48). They identified significant parts of human organs and recognized their functions (questions 22 and 69).

Detailed comments on four questions follow.

Use the following information to answer questions 15 to 17.

In a laboratory investigation, a student was given five different samples of unknown food and water mixtures and one sample containing only distilled water. The student tested the samples and recorded these results:

Sample Tested	Test Results			
	Benedict's reagent	Iodine	Biuret solution	Sudan IV
I	yellow-green	pale yellow-brown	blue	does not dissolve
II	blue	pale yellow-brown	purple/pink	does not dissolve
III	yellow-orange	pale yellow-brown	blue	does not dissolve
IV	blue	pale yellow-brown	blue	dissolves
V	blue	black	purple/pink	does not dissolve
VI	blue	pale yellow-brown	blue	does not dissolve

16. Bile would assist in the digestion of food found in which sample?

A. II
B. III
• C. IV
D. V

Question 16 required students to recall that bile assists in the digestion of fats. They also had to recall that Sudan IV dissolves in fats and therefore can be used to detect fat in a unknown food sample. This concept-lab integrated question was answered correctly by 96.1% of the students who achieved the standard of excellence (A) on the examination. Of the students who failed to achieve the acceptable standard, 46.0% selected the correct answer and 42.2% selected either distractor B or D. The association of bile with carbohydrate digestion and corresponding carbohydrate identification tests were most frequently confused with bile-assisted fat digestion and its identification. Of the students who obtained a B or C level of achievement on the whole examination, 70.3% selected the correct answer.

17. If a person ate the type of food contained in sample II, there could be an increase in the body's production of

• A. urea
B. glucose
C. glycogen
D. fatty acid

Question 17 required students to recall that Biuret solution is used to test for protein, not starch, sugar, or fat. Logical answers were provided for each of the four foods. However, the connection between urea and protein was more obscure than the connections between the other products (glucose, glycogen, fatty acid) and their corresponding foods. In the context of Biology 30, students generally understood the metabolism of carbohydrates by the small intestine and/or liver better than they understood the metabolism of proteins. Of the students who failed to achieve the acceptable standard, 19.3% selected the correct response and 58.5% selected products of carbohydrate metabolism (distractor B or distractor C). However, of the students who achieved the standard of excellence (A), 81.4% selected the correct answer. Of the students who obtained a B or C level of achievement, 36.5% selected the correct answer.

Use the following table to answer question 23.

	Blood Composition			
Subject	Erythrocytes per μL	Leukocytes per μL	Glucose mg/100mL	Plasma Proteins mg/100 mL
I	2 500 000	10 000	300	8 000
II	5 000 000	3 500	98	9 000
III	7 000 000	7 100	205	8 050
IV	7 000 000	6 900	100	6 000
Normal	5 000 000	7 000	100	8 000

23. Which subject is most likely an untreated diabetic who lives at a relatively high altitude?

A. I
B. II
• C. III
D. IV

Question 23 required students to understand the effects on blood composition of **two** variables: levels of insulin secretion and levels of atmospheric pressure. Students also had to recall the meaning of key terms (erythrocytes, leukocytes). A careful analysis of the data would then provide a plausible combination of quantities that corresponded to the subject's condition. This multistep integrated question was answered correctly by 89.7% of the students who achieved the standard of excellence (A) on the examination. Many students did not understand the effects of high altitude on blood cell quantities. Of the students who failed to achieve the acceptable standard, 24.7% selected the correct answer, whereas 42.3% selected distractor A. Of the students who obtained a B or C level of achievement, 56.4% selected the correct answer and 27.0% selected distractor A.

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31. Human lungs inflate as a result of

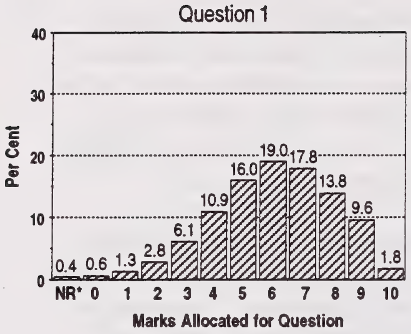
● **A.** reduced chest cavity pressure
B. relaxation of the chest muscles
C. reduced volume of the chest cavity
D. contraction of the bronchial muscles of the lungs

Question 31 required students to distinguish between the effects of muscle relaxation and of contraction on pressure and volume within the chest cavity. They also had to recall the location of the muscles used for inhalation. Many students (18.3%) had the misconception that the lungs inflate because the muscles within them contract (distractor D). Other students (11.0%) did not understand the subtle difference between the primary cause of an event and the complementary conditions that permit that event to occur (distractor B). That is, the increase in chest volume is caused by the contraction of certain muscles but at the same time is permitted by the relaxation of other muscles. Some students (13.8%) did not understand the relationship between inflation and volume (distractor C). Of the students who obtained a B or C level of achievement, 59.8% selected the correct answer. Of the students who achieved the standard of excellence on the examination, 90.0% selected the correct answer.

Written Response

The five questions in the written-response section are designed to assess achievement on six of the 10 content strands for Biology 30. In addition, question 1 required students to analyze and evaluate experimental designs and scientific data. To answer this question, students were expected to draw on their understanding of process skills as developed throughout the Biology 30 course. All five questions required students to apply their understanding of biological concepts to problems in human physiology. The questions required students to analyze contextual material before composing responses. Question 3 in particular required students to integrate several concepts and compose a response that clearly linked the structural and functional characteristics of specialized body parts.

Responses to the written-response section indicated that most students approached the examination seriously and made a commendable effort. All five questions were attempted by 85.6% of the students, and only 0.2% did not attempt any of the five questions. Some students (0.2%) achieved full marks on each question. However, approximately 45.7% of the students obtained less than 15 marks out of the 30 marks for the written-response section. Many students responded to the questions by presenting facts they could recall and did not relate them directly to the problems posed by the question.



*NR—No response

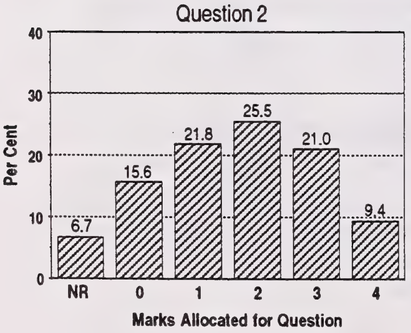
Question 1: Most students demonstrated a good understanding of the processes used in solving problems scientifically. They could interpret the data provided and thereby form relevant conclusions. They were quite aware of the fallacy of using conclusions to develop practical policies when those conclusions are based on limited investigations. Some students did not understand the distinction between manipulated, controlled, and responding variables. Students frequently identified rats as the manipulated variable rather than the type of liquid that was given to the rats.

In part b, some students criticized the experimental design rather than identifed the variables that were most likely controlled (fixed). Most students did not respond correctly to part c because they did not recognize that the manipulated variable (type of liquid) was one of the four factors that affected life expectancy. Many did not recognize the cause and effect relationships within a laboratory context. Most students presented valid conclusions for part d. However, many of these conclusions were inconcise or did not relate directly to the hypothesis as given in the context of the question.

Part e was answered well by most students. In part f, many students selected information from the second experiment that did not correspond to the subject of the conclusions they presented in part d. For example, if a student concluded that copper was important in lowering the incidence of heart disease, then the evaluation must relate to copper, not to alcohol. The answers to part g indicated that most students understood the implications of making practical choices based on incomplete data.

On question 1, there were more students (25.2%) who achieved the standard of excellence than who failed to achieve the acceptable standard (22.0%).

On this 10-mark question, the average mark was 6.02 or 60%.

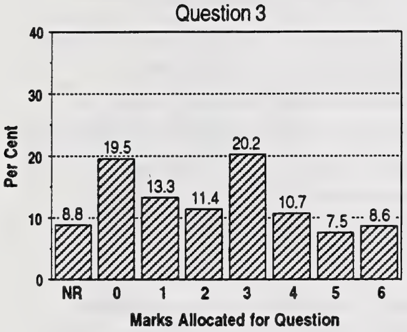


Question 2: Most students responded to part a of this question by reciting simplistic descriptions (knowledge) of the functions of each organelle. Too many students did not explain (comprehension and application) how the absence of each organelle would affect the processes of erythrocytes. Many students used analogous and/or metaphorical language (nucleus is like a brain; mitochondria are powerhouses) to identify functions. Many students also attributed human characteristics to cells; e.g., red blood cells do not have time or energy to concentrate on their jobs.

For part b, many students identified functions of erythrocytes but did not explain how these functions would be facilitated because of the absence of organelles.

Of the students who failed to achieve the acceptable standard on the examination, 15.1% obtained 2 marks or more for this question. Of the students who achieved the standard of excellence on the examination, 96.1% obtained 2 marks or more.

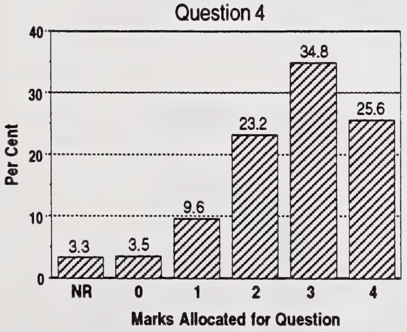
On this 4-mark question, the average mark was 1.73 or 43%.



Question 3: Approximately 16.1% of the students gave excellent answers to this partially open-ended question, but 28.3% obtained no marks at all. The students (53%) who obtained two marks or less on this question did not analyze the problem correctly. They did not understand the difference between a simple spinal reflex arc and a complex conditioned reflex that involved several regions of the brain. Many students described in detail the sympathetic nervous system rather than identified and described the nervous system pathways that would have been used in the specific situation described in the question. Some students expanded on side issues such as hormonal stimulation, muscle and neuron chemistry, or details of eye structure, without organizing their response around the main theme of "nervous system pathways".

Most students presented their answers in paragraph form as expected; however, many descriptions were not illustrated by diagrams as suggested. More students could have benefited from preparing a rough draft of their answer on the tear-out pages provided. This step would have facilitated a thoughtfully organized response, which many students did not provide.

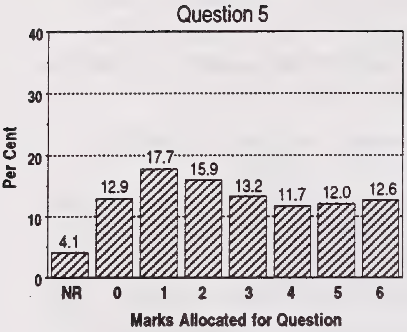
On this 6-mark question, the average mark was 2.29 or 38%.



Question 4: This question provided students the opportunity to select two body systems from which to illustrate the concept of homeostasis. Most students (60.4%) obtained full marks for explaining the results of a severe burn on one system, and at least partial marks for a second system. All four systems listed in the question were represented in the total set of answers.

Most students who selected the excretory system explained homeostatic imbalances in terms of the role of the skin (formation of sweat) rather than in terms of the kidneys (formation of urine) as anticipated. A few students took advantage of the overlap between the circulatory system and the immune system, and therefore gave a similar answer for each. However, answers for the immune system were poorly expressed; e.g., "the immune system has to work harder". Many students did not differentiate clearly between a change in a system and the effect that change has on homeostasis. This indicates that students have difficulty applying the concept of homeostasis, even though they may be able to define the term.

On this 4-mark question, the average mark was 2.63 or 66%.



Question 5: The students who achieved the standard of excellence on the examination answered this question very well. Only 4.4% of this group obtained less than 3 out of the 6 marks, and 46.3% obtained the full 6 marks. Of the students who failed to achieve the acceptable standard on the examination, 92.1% obtained less than 3 marks and 0.1% obtained the full 6 marks.

Most students answered part a correctly. In part b, most students identified the process (diffusion) but some did not correctly describe the difference in concentration between the patient's blood and the dialyzing fluid. Although many students understood the difference between parts b and c, they demonstrated an inadequate understanding of net movement or described the machine as having some sensing device to monitor levels of solutes in the blood.

In part d, many students referred to erythrocytes as molecules, not cells. Some students provided a definition of semipermeable and thereby simply repeated the information that was provided in the question. Other students answered the question in reference to the body's needs, not in reference to the characteristics of erythrocytes.

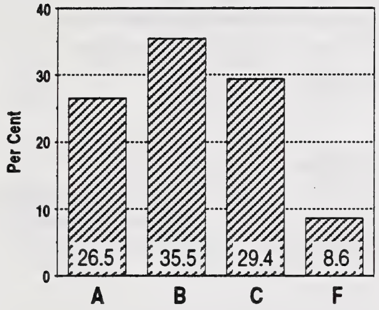
On this 6-mark question, the average mark was 2.71 or 45%.

For further information, contact Lowell Hackman or
Phill Campbell at the Student Evaluation Branch, 427–0010.

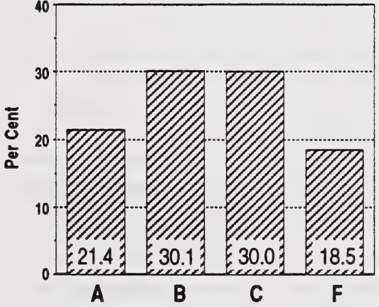
Chemistry 30

Diploma Examination Results
Examiners' Report for June 1992

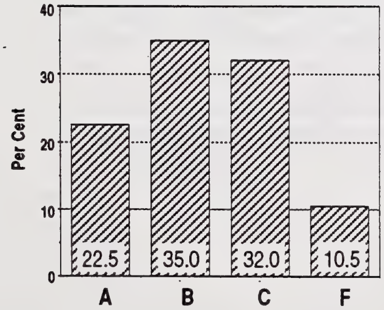
School-Awarded Mark



Diploma Examination Mark



Final Blended Mark



The summary information in this report provides teachers, school administrators, students, and the general public with an overview of results from the June 1992 administration of the Chemistry 30 Diploma Examination. This information is most helpful when used in conjunction with the detailed school and jurisdiction reports that have been mailed to schools and school jurisdiction offices. An annual provincial report containing a detailed analysis of the combined January, June, and August results will be available this fall.

Description of the Examination

The Chemistry 30 Diploma Examination consists of three parts: a multiple-choice section of 42 questions worth 60%, a numerical-response section of seven questions worth 10%, and a written-response section of three questions worth 30% of the total examination mark.

Achievement of Standards

The information reported is based on the final blended marks achieved by 8 980 students who wrote the June 1992 examination.

- 89.5% of these students achieved the acceptable standard (a final blended mark of 50% or higher).
- 22.5% of these students achieved the standard of excellence (a final blended mark of 80% or higher).

Overall, student achievement in Chemistry 30 was acceptable, particularly in knowledge of core concepts. However, students continued to have difficulty with laboratory-related skills and processes, and in organizing and communicating their chemistry knowledge.

Provincial Averages

- The average school-awarded mark was 68.6%.
- The average diploma examination mark was 64.9%.
- The average final blended mark, representing an equal weighting of the school-awarded and the diploma examination marks, was 67.1%.

Results and Examiners' Comments

Subtest

When analyzing detailed examination results, please bear in mind that subtest results **cannot** be directly compared.

Results are in average raw scores.

Machine scored: 33.05 out of 49

Written response: 12.3 out of 21

Course Content

- Chemical Energetics: 14.71 out of 23
- Acids and Bases: 15.58 out of 24
- Oxidation-Reduction: 15.06 out of 23

Process Skills: 22.79 out of 39

- Multiple-choice questions 3, 9, 15, 17, 20, 23, 25, 27, 29, 31, 36, and 38; numerical-response questions 2, 3, 4, 5, 6, and 7; and written-response questions 1, 2, and 3.

Cognitive Levels

- Knowledge: 14.58 out of 19
- Comprehension and Application: 24.06 out of 38
- Higher Mental Activities: 6.71 out of 13

Examination Blueprint

Each question on the examination is classified in two ways: according to the curricular content area being tested and according to the cognitive level demanded by the question. The examination blueprint illustrates the distribution of questions in June 1992 according to these classifications. Numbers with brackets [ ] indicate written-response questions, those with parentheses ( ) indicate numerical-response questions, and those without brackets or parentheses are multiple-choice questions.

	Questions by Cognitive Level			
Reporting Category	**Knowledge**	**Comprehension and Application**	**Higher Mental Activities**	**Examination Emphasis (%)**
Chemical Energetics	1, 2, 4, 5, 6, 7, 13	8, 9, 10, 11, 12, 14; (1), (2); [2]	3; (3); [2]	33
Acids and Bases	15, 16, 18, 19, 22	17, 20, 21, 24, 25, 27, 28; (5); [1]	23, 26; (4); [1]	34
Oxidation-Reduction	29, 30, 33, 36, 38, 39, 40	32, 34, 35, 41, 42; (6), (7); [3]	31, 37	33
Examination Emphasis (%)	27	53	20	100%

Note: For reporting purposes, the three cognitive levels of the written-response section have been combined into one component.

This examination has a balance of question types and difficulties. It is designed so that students capable of achieving the acceptable standard will obtain a mark of 50% or higher and students capable of achieving the standard of excellence will obtain a mark of 80% or higher. Future examinations will continue to require students to demonstrate clarity in their thinking and an understanding of concepts by applying their knowledge to new and novel situations. Students who achieved these expectations were successful on this examination. The next series of diploma examinations will continue to require students to communicate their answers in a clear, concise, and organized fashion.

Approximately 11.8% of the students who wrote the June 1992 examination and received a blended mark had written at least one other Chemistry 30 Diploma Examination during the January 1991 to January 1992 period. This subpopulation (1 061) achieved an examination average of 62.9% compared to 65.1% for the population (7 919) whose first writing of a Chemistry 30 Diploma Examination was in June 1992. By rewriting, however, this group of students increased their average examination score by 10.1%.

Multiple Choice

Question	Key	Difficulty*	Question	Key	Difficulty*	Question	Key	Difficulty*
1	A	96.3	15	D	94.2	29	A	91.5
2	D	55.1	16	C	52.2	30	A	66.3
3	C	54.0	17	D	33.9	31	C	67.3
4	A	67.6	18	C	89.6	32	B	82.3
5	C	74.4	19	A	87.8	33	B	79.2
6	D	74.5	20	C	80.7	34	D	47.4
7	A	81.2	21	A	68.5	35	D	69.0
8	A	43.5	22	B	89.9	36	B	48.4
9	B	83.4	23	C	24.1	37	D	73.2
10	B	63.3	24	B	70.6	38	D	67.9
11	C	68.0	25	A	65.3	39	C	80.1
12	C	85.0	26	D	84.6	40	C	81.0
13	D	81.2	27	A	46.5	41	B	52.4
14	B	49.0	28	D	80.5	42	B	75.4

*Difficulty—percentage of students answering the question correctly

For a complete breakdown of student responses by alternative for the multiple-choice questions, please refer to the school and jurisdiction reports.

The following questions were selected for discussion because they exemplify what is required to meet the acceptable standard and the standard of excellence.

9. A substance has a molar heat of combustion of –810.4 kJ/mol. When 0.285 mol of the substance is burned in a calorimeter containing 8.60 kg of water, the increase in water temperature is

A. 0.156°C
• B. 6.41°C
C. 7.89°C
D. 12.8°C

Question 9: Most students (96.4%) were able to recall or derive a method to solve this question, and 83.4% of all the students correctly did so. Of the students who answered incorrectly, most (5.7%) knew the method but were unable to manipulate the variable and as a result calculated 1/Δt rather than Δt. The other common mistake (7.1%) occurred when students divided the molar heat of combustion by the amount of the substance to calculate the total heat involved. The results for this question suggest that students attaining the acceptable standard understand fundamental concepts and are able to solve simple single-step problems involving energy transfer.

17. The weakest electrolyte would be a 0.10 mol/L solution of

A. $HCl_{(aq)}$
B. $NaCl_{(aq)}$
C. $NaOH_{(aq)}$
• D. $HOCl_{(aq)}$

Question 17: Most students (96.0%) correctly recognized that the 0.10 mol/L $HCl_{(aq)}$ solution would not be the weakest electrolyte. However, many (41.7%) incorrectly selected the 0.10 mol/L $NaCl_{(aq)}$ solution as being the weakest electrolyte. This suggests that students have limited knowledge about the properties of ionic compounds or that they used test-wise procedures and selected the “one that was different”. Only 33.9% of the student population (comprising 81.7% of those achieving the standard of excellence) correctly identified the 0.10 mol/L $HOCl_{(aq)}$ solution as being the weakest electrolyte. This result suggests that those students who do not attain the standard of excellence cannot transfer their conceptual knowledge into an empirical context.

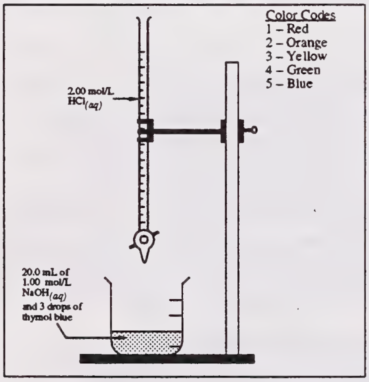
Numerical Response

Almost all students correctly followed the instructions for filling in the answer sheet. For future diploma examinations, students must ensure that their answers are recorded accurately and that, where appropriate, answers are rounded off correctly, or they will lose marks.

Question	Answer	Difficulty*
1	1.74	67.3
2	49.3	75.0
3	6.42	54.0
4	5, 5, 3, 1	15.4
5	2, 4, 3, 1	77.5
6	3.24	30.2
7	1.56	59.0

*Difficulty—percentage of students answering the question correctly

Use the following diagram and color code to answer question 4.



4. The code for the color of the solution in the beaker when

- no $HCl_{(aq)}$ is added is ______________
  (Record in first column)
- 5.0 mL of $HCl_{(aq)}$ are added is _______
  (Record in second column)
- 10.0 mL of $HCl_{(aq)}$ are added is ______
  (Record in third column)
- 15.0 mL of $HCl_{(aq)}$ are added is ______
  (Record in fourth column)

The average for **question 4** was 15.4%. This question discriminated well between strong and fairly strong students. The first mistake students (20.3%) made was not recognizing that initially the 1.00 mol/L $NaOH_{(aq)}$ solution containing thymol blue would be blue. An additional 29.9% of the student population failed to recognize that at the equivalence point, the solution would be yellow. Both these points did not require the student to perform any calculations. The remaining two points in the question could either be deduced or calculated. A total of 24.2% of the student population could not calculate or infer that at the second point of the titration, excess base remained and therefore the solution would stay blue. Another 10.2% of the student population was unable to recognize, deduce, or calculate that at the end of the titration, excess acid was present and that the solution would be red.

The results for this question suggest that students achieving the standard of excellence can successfully extract valid inferences from diagrammatic data and, where necessary, perform valid calculations.

Use the following information to answer question 5.

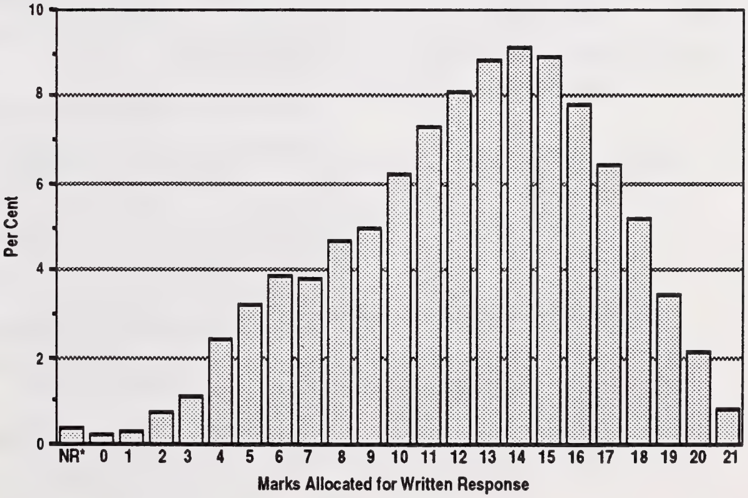
Solution	Indicator Color		
	phenolphthalein	indigo carmine	methyl orange
1	colorless	blue	red
2	pink	yellow	yellow
3	colorless	blue	yellow
4	pink	blue	yellow

5. When these solutions are arranged from highest to lowest pH value, their numerical sequence is ____________________.
(Record all four digits.)

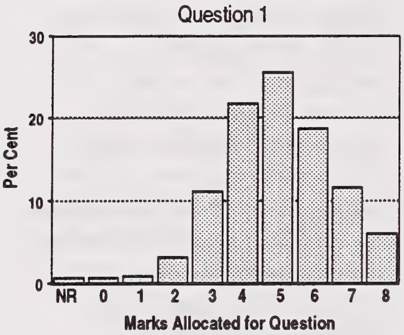
The average for **question 5** was 77.5%. The question discriminated well between weak and average students. The only recognizable mistake students (9.3%) made was reversing the correct order, which implies that these students do not understand the relationship between pH and $[H_3O^+_{(aq)}]$. This suggests that students achieving the acceptable standard do so because they are capable of tasks such as using indicator colors to determine the pH of a solution.

Written Response

The level of achievement on the written-response section was better than expected: about two-thirds of the students (68.0%) achieved a mark of 11 or higher out of 21. The average mark on the written-response section was 12.3 or 58.6% of the available marks.



*NR—No Response

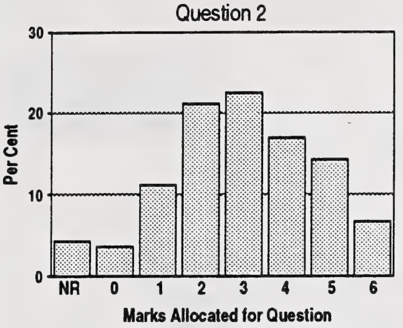


Question 1 was answered better than expected. This result was partly due to the dual purpose of the question: first, to measure students' ability to graph experimental data and, secondly, to test students' ability to extract meaningful information from the completed graph. A student who completed both could attain the standard of excellence. Students who did not meet the acceptable standard were unable to address the latter part of the question. Most of these students were able to construct a graph; however, the graphs exhibited incorrect scales, insufficient or incorrect labeling of axes, and showed evidence of "connecting the dots" rather than a smooth curve. In general, these students failed to effectively use the grid provided, and many did not indicate the equivalence point on the graph. These students also had difficulty expressing themselves. As a result, markers had to interpret their responses—which in many cases contained errors in the conventions of the communication used.

Students who attained the acceptable standard but not the standard of excellence generally had good graphing skills. These students did indicate an equivalence point; however, many marked the equivalence point as occurring at pH 7. These students had difficulty extracting information from the graph and, as a result, were unable to come up with an appropriate method of determining the concentration of the base being titrated. Many were confused about the difference between concentration and strength. They used terms such as "relatively strong, not acidic, dilute strong base, low caliber, middly, stable base, good strength, quite big" to describe a weak base. However, these students were generally able to select an acid-base indicator appropriate to their perceived equivalence point, and they communicated their ideas in a manner that required little, if any, interpretation.

Students who attained the standard of excellence constructed appropriate graphs, located the equivalence point accurately, and selected an appropriate indicator; most could also determine the concentration of the base. These students were able to describe the base as being weak, and most were able to justify their answer. The only weakness that prevented these students from earning full marks for this question was in justifying their identification. These students presented their answers in an organized fashion and expressed themselves clearly so that no interpretation was required by the marker.

On this 8-mark question, the average mark was 4.97 or 62%.

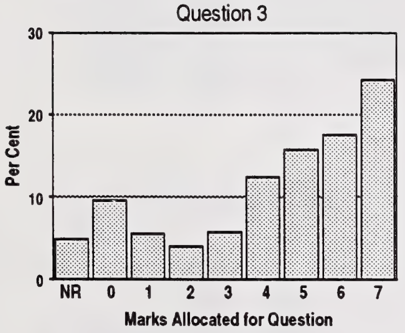


Question 2 was answered as well as expected. Students who did not attain the acceptable level on the examination had difficulty in determining the energy required both to warm and to melt the aluminum sample; many calculated one or the other. These students gave confused answers for part b: they either wrote several advantages and no disadvantages, or they failed to indicate which was which. Most of the responses by these students were poorly organized and communicated.

Students who attained the acceptable level on the examination correctly determined the amount of energy required to warm and melt the 16.1 g sample. Most were able to state an advantage, a disadvantage, and a conclusion about recycling. However, these students did not do a valid energy comparison when it came to justifying their position. The most common mistake was in comparing the energy required to warm and melt 16.1 g of aluminum with the energy required to form 1 g of aluminum by electrolysis. The majority of the responses to part a were well organized and easy to follow. For part b, the responses tended to ramble.

Students who attained the standard of excellence clearly communicated their answers. They had no difficulty determining the amount of energy required to warm and melt the aluminum sample, nor did these students have difficulty in stating an advantage, a disadvantage, a position, or in supporting their position with a valid comparison.

On this 6-mark question, the average mark was 2.98 or 50%.



Question 3 was answered better than expected. Students who did not attain the acceptable level on the examination scored 0 to 3 marks, as expected. Most of these student could identify at least two of the solutions correctly. Most had difficulty explaining how they reached their conclusions and, in many cases, gave no explanation at all.

Students who attained the acceptable level on the examination were expected to score 4 marks or higher. These students used a valid method to correctly identify each of the solutions and attempted an explanation. However, they were generally unsuccessful in justifying their conclusions. In general, the responses by these students were well written and fairly well organized.

Students who attained the standard of excellence were expected to score 7 marks and make no errors, both of which they did. They used a valid method to correctly identify each solution, and they explained how they reached each identification.

On this 7-mark question, the average mark was 4.35 or 62%.

For further information, contact Don Loerke, Lowell Hackman, or Phill Campbell at the Student Evaluation Branch, 427–0010.

Physics 30

Diploma Examination Results
Examiners' Report for June 1992

The summary information in this report provides teachers, school administrators, students, and the general public with an overview of results from the June 1992 administration of the Physics 30 Diploma Examination. This information is most helpful when used in conjunction with the detailed school and jurisdiction reports that have been mailed to schools and school jurisdiction offices. An annual provincial report containing a detailed analysis of the combined January, June, and August results will be available this fall.

Description of the Examination

The Physics 30 Diploma Examination consists of three parts: a multiple-choice section of 42 questions worth 60%, a numerical-response section of seven questions worth 10%, and a written-response section of four questions worth 30% of the total examination mark.

Achievement of Standards

The information reported is based on the final blended marks achieved by 4 953 students who wrote the June 1992 examination.

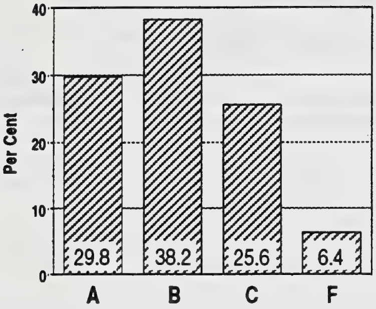
- 90.2% of these students achieved the acceptable standard (a final blended mark of 50% or higher).
- 25.1% of these students achieved the standard of excellence (a final blended mark of 80% or higher).

Overall, student performance in Physics 30 was satisfactory. Students' problem-solving skills continued to improve and they showed a good understanding of course content.

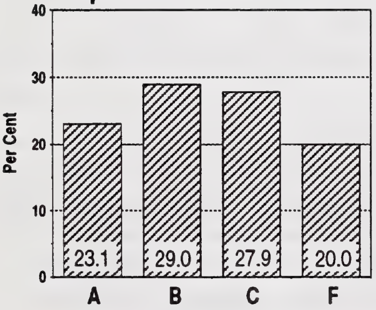
Provincial Averages

- The average school-awarded mark was 70.7%.
- The average diploma examination mark was 64.8%.
- The average final blended mark, representing an equal weighting of the school-awarded mark and the diploma examination mark, was 68.1%.

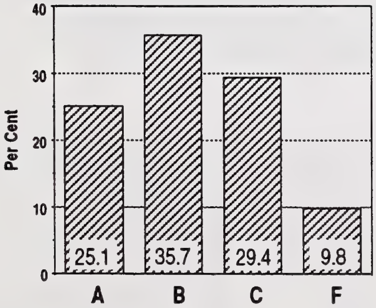
School-Awarded Mark



Diploma Examination Mark



Final Blended Mark



Results and Examiners' Comments

Subtest

When analyzing detailed examination results, please bear in mind that subtest results **cannot** be directly compared.

Results are in average raw scores.

Machine scored: 34.5 out of 49

Written response: 10.8 out of 21

Course Content
- Light: 11.1 out of 16
- Electric and Magnetic Fields: 12.5 out of 19
- Electromagnetic Radiation: 6.6 out of 10
- Structure of Matter: 9.1 out of 14
- Modern Physical Theories: 6.0 out of 11

Process Skills: 21.4 out of 37
- Multiple-choice questions 2, 4, 5, 9, 12, 15, 26, 27, 29, 30, 32, 35, 38, and 40; numerical-response questions 1 and 3; and written-response questions 1, 2, 3, and 4

Cognitive Levels
- Knowledge: 11.6 out of 17
- Comprehension and Application: 24.6 out of 35
- Higher Mental Activities: 9.0 out of 18

Examination Blueprint

Each question on the examination is classified in two ways: according to the curricular content area being tested and according to the cognitive level demanded by the question. The examination blueprint illustrates the distribution of questions in June 1992 according to these classifications. Numbers with brackets [ ] indicate written-response questions, those with parentheses ( ) indicate numerical-response questions, and those without brackets or parentheses are multiple-choice questions.

	Questions by Cognitive Level			
Reporting Category	**Knowledge**	**Comprehension and Application**	**Higher Mental Activities**	**Examination Emphasis (%)**
Light	3, 6, 7, 10	1, 8, 9, 11; (1); [2]	2, 4, 5	23
Electric and Magnetic Fields	13, 18, 19, 21	12, 14, 15, 16, 17, 20, 22; (2), (3)	[3]	27
Electromagnetic Radiation	23, 24, 25	27, 28, 29; (4), (5)	26, 30	14
Structure of Matter	31, 33, 34, 36	37; (6); [1]	32, 35	20
Modern Physical Theories	39, 41	38, 40, 42; (7)	[4]	16
Examination Emphasis (%)	24	50	26	100

This examination has a balance of question types and difficulties. It is designed so that students capable of achieving the acceptable standard will obtain a mark of 50% or higher and students capable of achieving the standard of excellence will obtain a mark of 80% or higher. This examination again included numerical-response questions, which students handled very well. Students achieving the acceptable standard were expected to show good communication skills in the written-response section of the examination, regardless of whether their answers were in calculation or verbal form.

Approximately 10% of the students who wrote this examination had written at least one other Physics 30 Diploma Examination. Most of these students either failed or scored below the provincial mean on their first writing. Although this group averaged almost 5% less than those students who wrote the examination for the first time, their average increased by almost 9% over their previous examination score.

Multiple Choice

Question	**Key**	**Difficulty***	**Question**	**Key**	**Difficulty***	**Question**	**Key**	**Difficulty***
1	B	91.0	15	A	71.8	29	A	70.9
2	B	79.5	16	A	90.5	30	D	35.6
3	C	59.2	17	C	83.7	31	D	87.5
4	D	55.9	18	C	49.4	32	A	60.7
5	A	71.0	19	A	63.2	33	B	70.6
6	B	73.1	20	A	57.0	34	D	64.8
7	A	86.6	21	B	85.8	35	C	52.3
8	C	91.0	22	C	76.9	36	B	57.5
9	D	73.5	23	D	65.5	37	A	43.8
10	C	63.4	24	B	80.4	38	C	78.4
11	D	74.3	25	D	40.8	39	D	71.4
12	C	81.1	26	D	59.3	40	B	46.4
13	B	60.4	27	A	68.6	41	A	82.1
14	D	94.0	28	C	95.4	42	C	80.8

*Difficulty—percentage of students answering the question correctly

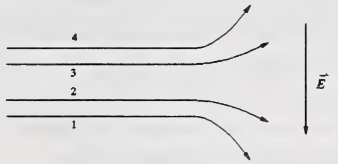
Multiple Choice and Numerical Response

All students were expected to demonstrate a high level of competence in calculations. Students achieving the standard of excellence were expected to apply their knowledge to unusual problems and to use scientific generalizations effectively. Students' performance on the machine-scored sections of the examination was generally satisfactory. The average score for the machine-scored sections was 70.4%. Students found the calculation questions to be the easiest. For a complete breakdown of student responses by alternative for the multiple-choice questions, please refer to the school and jurisdiction reports. Detailed comments on selected questions from the multiple-choice and numerical-response sections follow.

Multiple Choice

Use the following information to answer question 12.

Paths of Charged Particles in an Electric Field



The masses and speeds of the particles are equal.

12. Which statement is true?

A. The charges on particles 2 and 3 are equal in magnitude and in sign.
B. The charges on particles 3 and 4 are equal in magnitude and in sign.
• **C.** The charges on particles 2 and 3 are equal in magnitude but not in sign.
D. The charges on particles 3 and 4 are equal in magnitude but not in sign.

In **question 12,** students were asked to examine the paths of four charged particles having equal masses and travelling at the same speed in an electric field. From the paths these particles travelled, students were to determine which of four statements correctly described the nature of the charges on two of the particles. The key concepts students were expected to understand were that the sign of the charge determines the direction of the electrical force and that the magnitude of the charge determines the magnitude of the force and therefore the amount of curvature in the path. Well over three-quarters of the students achieving at the acceptable standard answered this question correctly.

35. A metal surface has a threshold frequency of f_o. If the metal surface is illuminated with radiation of a frequency of $3.5f_o$, then the maximum kinetic energy of emitted photoelectrons is

A. $4.5hf_o$
B. $3.5hf_o$
• **C.** $2.5hf_o$
D. $1.0hf_o$

Question 35 required students to demonstrate their understanding of the photoelectric effect in terms of the conservation of energy law. They were expected to find the total energy of the incident photon in terms of h and f_o and to subtract the amount of energy required to overcome the work function of the metal. Students achieving the standard of excellence had little difficulty with this question. Of the students who answered this question incorrectly, those achieving at the acceptable standard but not at the standard of excellence tended not to use the law of conservation of energy. They also ignored the work function of the metal.

Numerical Response

Question	Answer	Difficulty*
1	36.0	89.5
2	4.98	60.5
3	13.0	69.7
4	2.11	87.3
5	2.56	58.1
6	19.0	80.5
7	8.38	63.0

*Difficulty—percentage of students answering the question correctly

Most students correctly followed the instructions for filling in the answer sheet. All seven questions discriminated well between those students who reached an acceptable standard and those who did not. The questions showed that students achieving the acceptable standard can generate a correct response for questions that have an open-ended format.

3. A household circuit that can maintain a maximum current of 15.0 A with a potential difference of 120 V runs **three** 75.0 W light bulbs and a 7.50×10^2 W toaster. The **maximum** number of 60.0 W light bulbs that can be added to this circuit without overloading it is ________ bulbs.

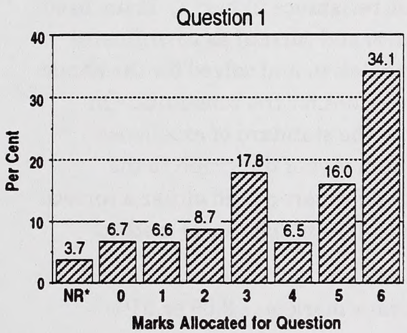
Question 3 was answered correctly by 69.7% of the students. They were required first to determine the maximum energy output for an electrical circuit and then to determine the number of specific appliances that could be operated without overloading the circuit. Students achieving the acceptable standard were expected to answer this question correctly and over three-quarters of them were successful. The most common error was in calculating the rate of energy consumption for the appliances already on the circuit. Many students used only one 75-watt bulb in their calculation rather than three. Another common error was failing to realize that the number of light bulbs had to be rounded down rather than up since it is not possible to have a fractional number of light bulbs. Students gave answers of 14 or 13.8 bulbs instead of the correct answer of 13 bulbs. Those students who committed this latter error were those not achieving the standard of excellence.

5. The distance from the Earth to the moon is 3.84×10^5 km. Using infra-red radiation, the time required for a signal to go to the moon and to return is ________ s.

Question 5 was the most difficult question in the numerical-response section, with 58.1% of the students answering it correctly. Students were expected to double the distance from the Earth to the moon and convert the distance to metres. This distance was to be divided by the speed of light to yield the correct answer. Approximately 18%, including a significant number of those students achieving the standard of excellence, did not double the distance for the time calculation. Conversely, students who did not achieve the standard of excellence more commonly neglected to convert kilometres to metres; approximately 6% of the students made this second mistake. A smaller number of students made both errors.

Written Response

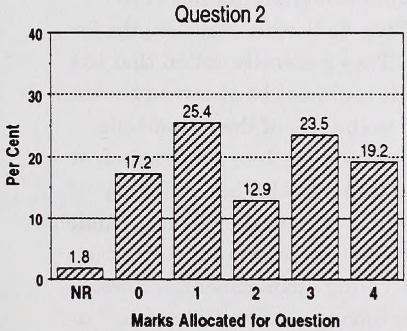
The four questions in the written-response section were created from four of the five strands for Physics 30. Students' problem-solving skills were tested most in questions 1c and 2, in parts b and c of question 3, and in question 4. Students achieving the acceptable standard on this examination were expected to get 3 out of 6 marks on each of questions 1 and 3, 2 out of 4 marks on question 2, and only 2 out of 5 marks on question 4. Students performing at a standard of excellence were expected to obtain near full marks on questions 1 and 2, 5 out of 6 marks on question 3, and 3 out of 5 marks on question 4.



*NR—No Response

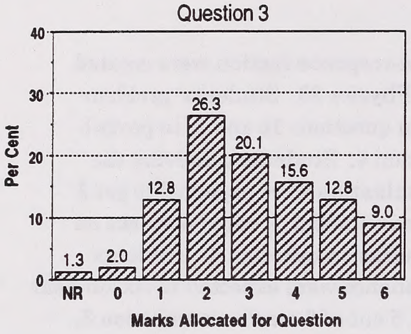
Question 1 was answered well. Parts a and b involved routine calculations in which students could directly apply equations from the data booklet with some transposition. Students achieving the acceptable standard had little trouble with these two parts. Part c required students to apply the law of conservation of energy by equating the change in electric potential energy to the kinetic energy the ion gained. Students achieving the standard of excellence had little difficulty with this part. Students achieving the acceptable standard but not the standard of excellence tended to apply equations from the data booklet without indicating that they were using a conservation law. Some of these students confused electric potential energy with electric field.

On this 6-mark question, the average mark was 3.88 or 65%.



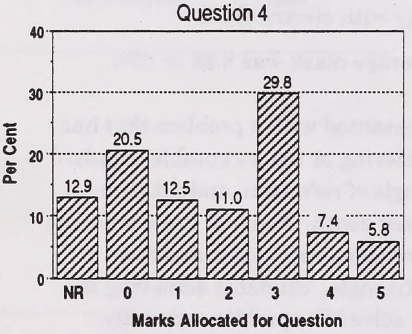
In **question 2,** students were presented with a problem that had a familiar context. Students achieving at the acceptable standard were expected to solve for the angle of refraction and attempt to use trigonometry to find the actual depth. Many of these students were unable to use the correct trigonometric ratios and often applied the ratios to an oblique triangle. Students achieving the standard of excellence generally solved the problem correctly. These students had little difficulty using trigonometry and some even used the law of sines or the law of cosines to find the actual depth of the pool. Students achieving the acceptable standard but not the standard of excellence tended to make errors in significant digits.

On this 4-mark question, the average mark was 1.99 or 50%.



Question 3 proved to be challenging. Most students graphed the experimental data correctly in part a, but students not achieving the standard of excellence experienced difficulty with either part b or part c, or both. Many of these students did not draw a relationship between the graph and the formula given and, therefore, did not use the vertical intercept and the slope to solve parts b and c respectively. Rather, they usually solved part c by relating the function directly to the data. These students experienced difficulty in finding the average and rarely considered a slope calculation to be a suitable averaging technique. In fact, some students found the slope and used it as the ohmic resistance in their solution for part b, and then used another averaging method to find the required ohmic resistance in part c. Many used the averages for potential difference and current as co-ordinates for a point described by the given relation and solved for the ohmic resistance using the data booklet values for the constants. On the other hand, students achieving the standard of excellence consistently related the vertical intercept of the graph to the function needed to solve part b, and for part c used either a correct averaging procedure or a slope calculation. The slope method was used less often.

On this 6-mark question, the average mark was 3.06 or 51%.



In **question 4,** students were asked to explain, with the use of supporting calculations, why the de Broglie wavelength cannot be observed for large objects but can be for subatomic particles. Students achieving at the acceptable standard but not at the standard of excellence calculated the de Broglie wavelengths for the automobile and the electron. They generally stated that the de Broglie wave for the automobile could not be observed because of its small magnitude compared to the size of the automobile rather than related the de Broglie wavelength to a diffraction or interference phenomenon. These students also had difficulty outlining relevant experiments or experimental evidence. Students achieving the standard of excellence often referred to diffraction experiments that were similar to Young's experiment and were thus not suitable for wavelengths having a magnitude of 10^{-10} m. They did not realize that in order to observe interference, the diffracting medium needs to be comparable in size to the wavelength being diffracted, and that in the absence of such a medium, the wave nature of the automobile cannot be observed.

On this 5-mark question, the average mark was 1.83 or 37%.

For further information, contact Jack Edwards, Lowell Hackman, or Phill Campbell at the Student Evaluation Branch, 427–0010.